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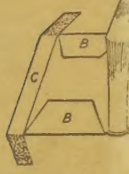

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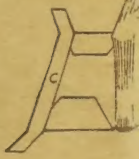

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CANADIAN GEOGRAPHY FOR JUNIORS

By courtesy of F. C. C. Lynch, Director of Natural Resources Intelligence Branch, Dept. of Interior.

A Pretty Little Nurse-maid from the Yukon

What season is it? Is it a level or hilly country? How is the baby fastened on the nurse's back? Do their clothes differ from those of white children?

CANADIAN GEOGRAPHY FOR JUNIORS

BRITISH COLUMBIA EDITION

BY

GEORGE A. CORNISH

REVISED WITH ADDITIONS BY

A. R. LORD

AND

V. L. DENTON

WITH 218 SKETCH MAPS,
DIAGRAMS AND ILLUSTRATIONS

1928

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INTRODUCTION

Interest, interest, and yet more interest is the keynote to success in teaching junior geography. Yet how little we teachers know about the natural interests of children and how to appeal to them. We sometimes allow others to surpass us. The cross-word puzzle can hold children to their dictionaries for hours at a time, the cartoonist can make them more eager to devour funny pictures than their breakfasts, the newspaper with its illustrated supplement and picture page can enthral them for half-an-hour every day, while we can often only keep them at their books by means of threats, detentions or other coercive measures.

No sooner does some new scheme or invention arise than newspapers, business men, advertisers, railways, and governments instantly seize upon it to serve their ends, whether with pictures, puzzles, moving-pictures, or radio, while teachers too often continue in the old dull paths.

Suppose you were to announce to your class, as a special incentive to stimulate interest, that to-morrow you would give a geography lesson on the boundaries of Europe, the surface features of British Columbia, the winds of the Atlantic Ocean, the climate of North America, or the coast-waters of Australia. Would there be any violent hand-clapping, vociferous cheering, or vivid sparkling of eyes? No. Your announcement would probably bring a sudden silence. Yet these are the topics on which we usually build our geography lessons.

The present elementary text-book is a protest against such unpedagogical, unpsychological, dry-as-dust methods of presenting geography to children.

In this little book the author has tried to select topics that are naturally interesting, and that will seem worth while to children. Important geographical facts are built up around these centres of interest, because children are much more likely to remember them in such relationships. The old-fashioned method of setting every continent, country and province in the same monotonous groove of position, extent, boundaries, coast-waters, surface, climate, is cast aside. Topics of many kinds, journeys, products, cities, occupations, natural phenomena, are moulded into problems to be

solved, no two of which are similar or treated in the same way. The pupils attack every new problem with a zest and curiosity that compel their interest.

Since variety of treatment sustains interest, the author has endeavoured to introduce as many literary devices as possible, and in no two chapters is the subject matter handled in the same manner. In one chapter a fish tells the story of its life, while in another a heated discussion takes place between an inquisitive boy and his pedagogical father as to the relative importance of a peak and a pass. A trip across the wind belts of the Atlantic Ocean is followed by an imaginary debate. Though such literary forms take slightly more space, they add variety and vividness.

The author has not hesitated to use all the justifiable devices of the shrewd editor of a newspaper or the hard-headed business man, in order to compel attention. Certain instincts are strong in children. The advertiser, the newspaper, and the entertainer successfully appeal to these. Why should not the teacher feed these instincts and direct them into useful channels? Is not that one of his chief functions? Children delight in solving puzzles. Therefore the author has not hesitated to teach them geography through puzzles. Picture puzzles, map puzzles, cross-word puzzles, and question puzzles are all found in this book.

What appeal more to a child than clear pictures full of action? Pictures in a text-book, once vividly impressed on young eyes, will still be remembered even in old age. This striking fact has led the author to devote one-half of this book to pictures. They have been selected with the greatest care, and every effort has been made to preserve the beauty and definition of the original prints.

This volume with its companion, the *Canadian School Geography*, contains a complete course for the elementary schools of Canada. While the latter volume should be used in grades seven and eight, the present volume is suitable for grades five and six. The *Canadian School Atlas* should be used with both.

The geography of the same continents, countries and provinces is taught several times in school—first in grades five and six, next in grades seven and eight, and finally in the lower forms of the high school. As a rule the text-books used in the different grades treat continents, countries and provinces in about the same way, with the result that pupils become weary with learning, several times over, facts as to position, surface, drainage, etc.

An attempt has been made in these two books to overcome these defects. The junior text-book does not deal primarily with countries,

nor does it attempt to cover the whole field of regional geography. It selects a number of topics, considered interesting to children, from all departments of the subject, and by treating these rather fully, it endeavours to lead the pupil to grasp main geographical relationships, and to fill his mind with concrete pictures of the people, occupations, productions, and natural phenomena of many parts of the world. It tries to arouse his interest in many regions in order that he may be desirous to learn more about them. Then he is introduced to the senior book, where all the countries of the world are treated in order. Hence the first book, instead of taking the edge off his appetite for the second, should rather whet it and make him call eagerly for more.

CONTENTS

CHAPTER I

PAGE

The Canadian Trapper 1

CHAPTER II

Canada's Ice Age 17

CHAPTER III

The Life of Mrs. Sockeye Salmon 26

CHAPTER IV

The Big Trees of British Columbia 40

CHAPTER V

Buried Treasure 52

CHAPTER VI

A Visit to a Dairy Farm 67

CHAPTER VII

The Throat of the Rockies 83

CHAPTER VIII

"My Diary" 90

CHAPTER IX

The Great Lakes and the St. Lawrence 104

CHAPTER X

Which is going to be Larger, Toronto or Winnipeg? 119

CHAPTER XI

The World's Last Great Sailors 129

CHAPTER XII

PAGE

Across the United States by Aeroplane 141

CHAPTER XIII

Our South American Neighbours 164

CHAPTER XIV

Europe 187

CHAPTER XV

Asia, the Continent of Giants 249

CHAPTER XVI

Africa, the Cake-Like Continent 265

CHAPTER XVII

Tales of John Bull's Family 287

CHAPTER XVIII

Calendar of the British Empire 313

Index 327

LIST OF ILLUSTRATIONS

FIG.		PAGE
	A little maid from the Yukon	*Frontispiece*
1.	Where the world gets its furs	3
2.	Caribou or American reindeer	4
3.	Two Eskimo women in their Sunday clothes	4
4.	Young gamblers: a study in hats	7
5.	Policemen in Northern Canada	7
6.	Eskimos in kayaks on Hudson Bay	8
7.	Simple life on the border of Hudson Bay	8
8.	Hudson Bay posts in Canada	11
9.	An Indian trap for catching martens	12
10.	A snare for catching rabbits	12
11.	Musk-oxen	15
12.	An exciting ride	15
13.	The gem of the Rockies: Lake Louise	16
14.	Parts of Canada covered by ice-sheets	17
15.	A rock in a dreary land	19
16.	A ridge formed under the ice-sheet	19
17.	Northern Canada's mosaic of silver and green	20
18.	Spring, Sockeye, Coho and Humpback	23
19.	Salmon-fishing at the mouth of the Fraser River	24
20.	A good catch	27
21.	Where salmon by the million are canned	28
22.	Canneries line the Skeena River	31
23.	A ladder for salmon to climb a waterfall	31
24.	Indians on a branch of the Skeena River hooking salmon	32
25.	A wickerwork trap for catching salmon	32
26.	Harpooning a whale off the coast of British Columbia	35
27.	Prince Rupert, the greatest fishing town in British Columbia	36
28.	A job that requires a cool head	41
29.	Lifting ten-ton logs on to cars	41
30.	The death of the giant	42
31.	Licking a salmon can clean	45
32.	Rocky-mountain goat	45
33.	The logging railway	46
34.	Unloading logs from a car	46
35.	British Columbia in every continent	47
36.	Coal-mine entrance, Cassidy, Vancouver Island	49
37.	Loading coal into cars	49
38.	A car-load of coal from Granby Colliery at Cassidy	50
39.	The concentrator at Britannia Beach, B.C.	50
40.	The prospector for gold	53
41.	A miner at work	53
42.	A smelter at Trail, B.C.	54
43.	Concentrator at Kimberley, B.C.	57
44.	Entrance to Sullivan Mine, Kimberley, B.C.	57
45.	Dumping the waste	58
46.	The greatest gold mine in the world	58
47.	The coast of British Columbia from Bella Coola to Alaska	63
48.	Canada's Mining Provinces, and the minerals of British Columbia	63
49.	A dairy farm in British Columbia	65
50.	Boys' and Girls' Jersey Calf Club exhibiting at Chilliwack	65
51.	A bit of the "Okanagan-Cariboo Trail."	66
52.	Orchards near Vernon, B.C.	66
53.	The main irrigation canal at Oliver, B.C.	69
54.	Carrying water from one hill, down through a valley, and over to another hill	69
55.	A crop of onions near Kelowna, B.C.	70
56.	An orchard scene in the Okanagan Valley	70
57.	Gordon Head district, Vancouver Island, B.C.	73
58.	An Okanagan fruit-packing house	74
59.	A settler's house in the Bulkley Valley	77

FIG.		PAGE
60.	Near Vanderhoof in the Nechako Valley	77
61.	The garden of British Columbia	78
62.	Two great bridges across the Fraser River	81
63.	Passes through the Rockies	82
64.	The south-western section of British Columbia	84
65.	Central British Columbia	84
66.	Calgary: the guardian of Kicking Horse Pass	85
67.	Edmonton: the guardian of the Yellowhead Pass	85
68.	The grades of transcontinental railways	86
69.	Cutting grain on a large farm in Saskatchewan	91
70.	Threshing at Portage Plains, Manitoba	91
71.	Getting on in Alberta	92
72.	The first home of a Russian peasant in Alberta	92
73.	Natural divisions of the Prairie Provinces	95
74.	A map of the Peace River district	95
75.	Number One, Manitoba Hard	96
76.	A square mile of gold	96
77.	The Prince of Wales's ranch in Alberta	99
78.	Elevators line the railways everywhere on the prairies	99
79.	A terminal elevator at Vancouver	100
80.	Where does our wheat go?	103
81.	The thunder of waters: Niagara's cataract	105
82.	Map of the great lakes	105
83.	Economic map of Ontario	106
84.	Economic map of Quebec	106
85.	Part of Ottawa	109
86.	The hub of Canada	109
87.	Took two hundred years to grow, one hour to fell	110
88.	Large punch press	113
89.	The largest store in the British Empire	114
90.	Toronto's skyscrapers	117
91.	The hub of the prairies: Winnipeg	118
92.	Railways around Toronto	121
93.	The railway feeders of Winnipeg	121
94.	The hunter's return	122
95.	The harvest of the sea	127
96.	Canada's codfish in every climate	127
97.	A snug fishing town: Lunenburg	128
98.	A fishing fleet in the Maritime Provinces	131
99.	A fishing schooner starting for the Grand Bank	131
100.	Fishing on the banks	132
101.	Drying the codfish	135
102.	A cross-word puzzle of Canadian geographical names	136
103.	A sailing trip from Lunenburg to Rio de Janeiro	139
104.	The greatest collection of giant buildings in the world	140
105.	Air view of New Orleans	143
106.	Aerial view of the city of Buffalo	144
107.	Iron ore docks at Duluth	144
108.	From fire to ice	147
109.	The Grand Canyon of the Colorado River from the air	147
110.	Mountains of salmon cans	148
111.	A square mile of prunes	148
112.	Threshing rice in Louisiana	151
113.	Wheat passes from field to bag	151
114.	A hydro-electric power plant in the State of Washington	152
115.	Strange rafts of logs in Western United States	155
116.	Columbia River from the air	155
117.	The making of a movie at Hollywood	156
118.	Making the turpentine flow	159
119.	Geysers in Yellowstone Park	160
120.	Yucca trees among desert shrubs	160
121.	A cottage in the tropical forest	165
122.	Natives on the Amazon River	166
123.	A typical road through the Andes	169
124.	A pottery market in Bogota	169
125.	The Magdalena River	170
126.	One of the highest cities in South America: Quito	170
127.	Average annual rainfall	172
128.	Temperatures of hottest and coldest months	172
129.	Square miles of grape-vines in Argentina	173
130.	A mountain of wheat	174
131.	Sheep, sheep, and more sheep	174
132.	Buenos Aires	177
133.	Health training in the public schools at Rio de Janeiro	177
134.	Scrambled countries of South America	178

FIG.		PAGE
135.	More scrambled countries of South America	181
136.	Tapping a rubber tree in the Amazon Valley	182
137.	In Banana-land	182
138.	How to find the area of a continent	186
139.	The Houses of Parliament from the River Thames	189
140.	Carding room in a cotton factory at Oldham, England	190
141.	An English colliery	193
142.	The sheet mills of Messrs. Baldwins' steelworks in S. Wales	194
143.	A shipyard at Belfast	194
144.	A busy scene in the heart of London	197
145.	In the Highlands of Scotland	198
146.	Glenmore Linen Bleach Green	201
147.	Putting flax into the dam for retting	201
148.	A picture puzzle of the manufactures of Great Britain and Ireland	202
149.	Paris as the centre of roads, railroads and waterways	206
150.	In the heart of Paris	207
151.	A canal in France	207
152.	Polders in the Netherlands	208
153.	A field in Flanders	208
154.	The Rhine at Cologne	215
155.	The shortest people of Europe: the Laplanders	216
156.	Enjoying the winter in Oslo	219
157.	A Norwegian scene	221
158.	Stockholm	221
159.	Acreage of potatoes	222
160.	Production of wheat	222
161.	The Kremlin, Moscow	227
162.	Interior of a Russian peasant house	227
163.	A great city of Europe: Prague	228
164.	A church in Norway eight hundred years old	228
165.	How a beautiful carpet is made	233
166.	Spinning and weaving in the home	234
167.	The year's vintage in Bulgaria	234
168.	Roads, countries and capitals of the Balkans	235
169.	Rainfall and population map of Spain	238
170.	The Parthenon from the north-west at Athens	239
171.	The Alhambra at Granada	240
172.	Cork oaks	240
173.	Mountain Ranges of Italy	241
174.	Swiss village in a valley	245
175.	Sticking his head among the clouds	245
176.	Regions of Asia where rivers dry up	248
177.	The five throats of the world	250
178.	A royal tiger hunt	251
179.	Transporting bags of rice in Korea	253
180.	Chinese gardeners bring vegetables to market	253
181.	Japan's sacred mountain, Fuji	254
182.	Japanese at home	254
183.	The hum of industry in Port Arthur	257
184.	An Arab beauty	258
185.	An Arab beggar and a stork	258
186.	Where our dates come from	293
187.	All aboard! a ride on an elephant's back	264
188.	Driving a bargain in Java	267
189.	A wonderfully carved shrine in Bangkok, Siam	268
190.	Canada and Africa	271
191.	The mystery river of Africa: the Nile	272
192.	A city with a million inhabitants	275
193.	Fruit market in Zanzibar	276
194.	Good-morning! This is a very slippery world!	277
195.	A South African stock farm	277
196.	A freight train in Central Africa	278
197.	Coasting along East Africa	278
198.	High-speed ploughing in North Africa	281
199.	A town built of mud	282
200.	An oasis in the Desert of Morocco	282
201.	Acres of cloves	285
202.	Teaching school-children in North Africa	286
203.	Fat sheep ready for market	286
204.	A pest made profitable	290
205.	Ploughing on a large scale	293
206.	Where the shine on the kettle comes from	294
207.	Auto tires from a rubber tree	294
208.	A house built like a basket	297
209.	A house like a beehive	297
210.	Gold is taken from the rock	298
211.	A study in yellow, green and black	301
212.	Where the Easter lilies bloom	302
213.	Having a bath in South Africa	305
214.	Making cotton cloth in British West Africa	306
215.	Mahogany logs in West Africa	309
216.	A study in black and white in Rhodesia	310
217.	Husking coco-nuts in Zanzibar	310

CANADIAN GEOGRAPHY FOR JUNIORS

CHAPTER I

THE CANADIAN TRAPPER

THE STORY OF THE HUDSON BAY COMPANY

1. **Why do we wear furs?** When the cold winter weather spreads over the land of Canada, the people get out their fur coats and their muffs and stoles. Some people wear fur-lined mittens and shoes (if we live on the prairie). We even wear fur hats, which we pull well down over our ears. There must be something about fur which keeps out the cold and that keeps in the warmth of the body.

Examine a piece of fur. What kinds of hairs do you find? How do these differ from one another? What kind of fur coats have the cat, the dog, the horse, and the sheep? Which has the warmest coat? There are other animals which have fur coats. Write out a list of these. There are the mink, the marten, the beaver, and many others. Try to describe each kind of fur as to colour, texture, length of hairs, values, and uses. Look up in an encyclopædia a description of each animal and the kind of fur obtained from each. Which are the most expensive furs? Which are the cheapest?

2. **Where do fur-bearing animals live?** Are there any fur-bearing animals living in Canada? What parts of Canada do they live in? In what ways is the climate of Canada particularly suitable for fur-bearing animals? Read the following story, and you will find answers to these questions.

The land of furs lies in northern Canada, and is represented on Map 9 in the Atlas by two colours: the tundra region near the Arctic Ocean and Hudson Bay, and the northern forest belt. Near the sea in the tundra region live the Eskimo, while further south, in the forest, live the Indians and white trappers. All of these people live by trapping.

You would wonder how the Eskimo could find anything to eat, or where he would find any furs. The tundra is bare of trees, and the hollows between the rolling hills are filled with water or dangerous muskeg in the

summer-time. It is only in the protected river valleys that you will find small spruce and poplar trees. The long days, however, give much sunlight and berries ripen on the low-growing bushes. Many bright flowers are to be seen blooming in the green grass. During the summer the Eskimo catches rabbits and birds. He gathers the eggs of the wild ducks and geese and hunts the caribou. This is a time of plenty in the far Northland, and everyone is happy. The days are long and warm, and the Eskimo family lives in a skin tent or a hut made of stones and chinked with moss or dirt.

When October comes, the lakes begin to freeze over and snow covers the low bushes and the mosses. Then the Eskimo moves from his summer home on the tundra to his winter home near the sea-shore and builds a house of snow. We call this house an igloo, and it is well suited to the climate. There are no cracks for the piercing wind to enter, and the long tunnel makes a warm doorway. There is no wood with which to build a house, as we would like to do. Then, too, the snow house is warmer than any log or wood house. The igloo requires no nails, no saws or tools. A snow knife made of bone is all the Eskimo needs to cut out the snow blocks.

It is then that the Eskimo hunts the straggling herds of the caribou as they move southward to their winter pastures. The hides are made into winter clothing and the flesh and fat are stored away for food. The strong husky dogs help to drag in the carcasses. They too must be fed, and there is never a time all winter when the Eskimo hunters feel that they have enough food to last until the returning sun brings back the long days of summer. The wolves follow the caribou herds and the Eskimo is glad to shoot some of these fierce brutes so that the pelts may be traded to a passing whaler or at the nearest fur post. Sometimes a fat bear is caught before he has had time to hide away for the winter. The foxes follow the trail of the wolves, and hunt the ptarmigan. Some of the pelts of the Arctic fox are very beautiful and command a fine price. The Eskimo is always on the watch for signs of these inquisitive and beautiful animals.

The sea is the true larder of the Eskimo. He sets nets in the shallow water under the ice and catches fish. He finds the breathing holes of the seals and patiently waits for his quarry to appear. Every part of the seal is utilized. The fat makes oil for the Eskimo's stone lamp, which gives him light and warms his igloo. The carcass is the best of food in a cold climate, while the hide or skin is used to make water-proof boots and to cover the frame of the boat, or kayak. Occasionally a whale comes ashore. Then all the Eskimo families are happy and the dogs are lazy and contented.

FIG. 1. WHERE THE WORLD GETS ITS FURS

In what cold and in what warm countries is hunting the chief occupation? In which are the most fur-producing animals found? What furs are obtained in Canada and in Siberia? What two countries produce opossum? Where is chinchilla found? Which of the furs named in the map is got from a domestic animal? Name four animals that produce white fur. Seal, sable, silver and black fox, ermine, chinchilla, and sea otter are called the precious furs. Where is each obtained?

Courtesy of New York Zoological Society.

FIG. 2. CARIBOU OR AMERICAN REINDEER

Found in very large droves in Northern Canada. An attempt is being made to establish caribou ranches for increasing the meat supply.

Courtesy of Geological Society, Ottawa.

FIG. 3. TWO ESKIMO WOMEN IN THEIR SUNDAY CLOTHES

Notice that their garments are made of skin. This is a summer costume. The photograph was taken on the coast of the Arctic Ocean by the Canadian Arctic expedition under Vilhjalmur Stefansson.

The Eskimo people are busy because they must make everything they need. If a hunter wishes to buy a rifle or ammunition he must travel hundreds of miles to the nearest trading post and offer many precious furs to the trader. It is a cold, hard land, but the Eskimo enjoys his life. He is free to go where he will and he is independent. Eskimo villages are generally a hundred miles apart. A large area is needed in order to support a few families.

From what you have just read make a list of the furs which the Eskimo would offer a trader. What would the Eskimo like to buy from the trader? In what way does the Eskimo adapt himself to the land in which he lives? Why does the Eskimo eat so much fat and oily flesh? Of what is his *parka* made?

The Indians live farther south in the forest belt. More fur-bearing animals are found here than farther north in the tundra region. The summers are a little longer and the winters are not quite so cold (see Maps 10 and 11 in the Atlas), so that trees are able to grow. This is a vast region which for two hundred and fifty years has been farmed by a great fur-trading Company. The tundra and forest belt comprise a region almost half as large as the United States and larger than any country in Europe. It is bordered by three oceans and almost cut in two by the great bay from which the Company got its name.

To the east of Hudson Bay lies bleak Ungava, high and rocky (Map 18, Atlas). The greater part of Ungava is a wilderness almost as unknown to the white man as the centre of the earth. To the west of the Bay the land is a low plain made by the silt brought down by the rivers which drain into this inland sea. But in the old, worn-down mountains of the Canadian Shield are thousands of lakes, some large, some small; some long and crooked, some round little ponds. These are connected by winding streams which grow into deep rivers, forming a veritable maze of waterways. The whole land is forested with spruce and pine. It is a dark, close forest which covers the land down to the edge of the lake and even to the river-bank. Between the rocky hills of the Canadian Shield and the rampart of the towering Rockies a great river drains to the north. It has hundreds of tributaries and three large lakes. Try to draw these lakes and rivers on an outline map of Canada. Find their names (Map 17, Atlas).

This is the hunter's paradise. There are fish in the streams and lakes. The otter and the mink grow large and fat, and the cold water makes their coats sleek, heavy and glossy. The beavers build their dams across the streams, and the musk-rats build their houses among the reeds of the shallow ponds. If there were fewer streams there would be fewer fur-

bearing animals. In the open meadows the moose and the deer feed on the tender saplings and find plenty of grass in the summer-time. The bears grow fat on the berries and scoop the fish from the shallow pools. The big, grey timber wolves fare on the deer and the rabbits. Everywhere beneath the silent forest and along the stream beds there are hunters and hunted, life and death.

Throughout this vast land are the scattered posts of the Hudson Bay Company. One stands guard at the mouth of every river where there is an opportunity for trade. At the foot of the page is a list of some of these trading posts. Find their location and place them on your outline map.

Travelling in the North. The rivers and lakes form a great network of waterways through the forest. The Mackenzie and its many tributaries act as a vast artery carrying the life-blood of trade throughout the central strip of the plain. A hundred rivers, like spokes in a wheel, carry furs down to Hudson Bay. There are also many undrained hollows in the rock, where for thousands of years moss has grown, layer upon layer, until the hollows have become quaking masses of decayed vegetation. Man attempts to cross these *muskegs* at his peril.

In the summer-time everyone uses the birch-bark canoe in travelling from place to place. The Indian strips the bark from the tree, shapes it around ribs of wood, and leaves it in the sun to dry and stiffen. In a few days he has a boat so light that it can be carried on his shoulders around a waterfall, or from the headwaters of one river to those of another. Yet it is strong enough to carry his year's catch of furs, as well as his family, down to the Hudson Bay post.

In October ice begins to form on the smaller lakes, and snow soon covers the ground. By late November all but the very largest lakes are covered with thick ice, and for six, seven, or eight months of the year the trapper's world is a white wilderness of snow. Then snow-shoes and dog-trains will carry the traveller along the frozen stream beds and from valley to valley.

The trapper. The Eskimo, the Indian and the other trappers in this white wilderness of the north make their living by outwitting the wild

HUDSON BAY TRADING POSTS

Fort McLeod.	Fort Providence.	Fort Ile à la Crosse.	Moose Factory.
Fort St. John.	Fort Rae.	Cumberland House.	Rupert House.
Fort Vermillion.	Fort Simpson.	York Factory.	Fort Eastmain.
Fort Chipewyan.	Fort Norman.	Fort Churchill.	Fort George.
Fort Smith.	Fort Good Hope.	Fort Severn.	
Fort Resolution	Fort McPherson.	Fort Albany.	

By courtesy of the Hudson Bay Company.

FIG. 4. YOUNG GAMBLERS—A STUDY IN HATS

Seven Eskimo boys at Fort Rae, Great Slave Lake, gambling with buttons. Notice their dark complexion and long, coarse black hair. Find Great Slave Lake on your map.

By courtesy of Canadian Pacific Railway.

FIG. 5. POLICEMEN IN NORTHERN CANADA

Describe the sleigh. How many dogs draw each sleigh? Describe the harness. What is the size and colour of the dogs? How do the men travel? Of what is their shack built? Which room is kept warmer? What is probably used for fuel? Which man is not a policeman? Why do you think so? What are the duties of policemen in the Hudson Bay district?

By courtesy of Canadian Pacific Railway.

FIG. 6. ESKIMOS IN KAYAKS ON HUDSON BAY

How do these boats differ from ours? They are made of sealskin stretched over a frame. Describe the paddle. As the man's skirt is fastened tightly to the rim of the opening it cannot ship any water. Even when a kayak turns over with a man fastened in he can right it again. How long and wide are these boats? What has the boatman learned from white men?

By courtesy of Canadian Pacific Railway.

FIG. 7. SIMPLE LIFE ON THE BORDER OF HUDSON BAY

Describe the trapper's house. Of what is it made? Why are poles put outside as well as inside? Of what is the canoe made? How does it differ in shape from a canoe in Southern Canada? Find the dog. Are there trees along the river?

animals. Let us accompany a trapper on one of his hard journeys to visit his traps. His log shack is stoutly built so that the inquisitive wolverine cannot break in and ruin his store of food. It is a single room with a stove, a table, a bench, and a bunk lined with spruce boughs. A few shelves are his pantry, and a bucket stands near filled with water from the nearby stream. Cords of split wood are piled close to the door in the fall, so that he will have dry fuel ready for the long, cold winter. On the log walls hang some raw furs with the skin turned outward. His ever-hungry dogs—quarrelsome brutes—are ready to snap at anything that comes their way. His nearest neighbour is fifty miles farther up the stream, and the Hudson Bay post at which he trades is over two hundred miles down the stream.

It may take a fortnight to go to the end of his trap line and return. So the trapper takes a little tea, tobacco, and a few handfuls of flour or dried beans. He travels light, and plans to depend for most of his food on what he can shoot or trap during the journey. When the snow becomes deep he wears snow-shoes.

The first part of his journey is across a marsh, from which rise many dome-shaped masses of rushes. Huddled close together in the space below each dome is a family of musk-rats. His traps have been cleverly set near the outlet, and several fine *musquash* are secured. These he hides under the ice where he can get them on his return.

That night, and every night, he sleeps rolled up in his blankets with his feet toward a roaring fire, fragrant spruce-boughs for a bed and the dark sky for his only roof.

Next morning he has not gone far when he stops suddenly and begins to search carefully in the snow. At last he lifts up a very small trap, and takes from it a dainty little ermine, with fur rivalling the pure snow in whiteness. On a former trip he had seen little marks in the snow like the dots and dashes of telegraphic letters. He knew at once that they were the tracks of a young ermine with a fur delicate and white, fit for the robe of a king. As no ordinary trap or snare dare touch its dainty body, for fear of marring its purity, he had set a trap without teeth in its jaws, and had thus secured his victim.

On this day he walked twenty miles through the dark spruce forest examining his marten traps. These are of two kinds, the dead-fall and the steel trap. In the first, which is home-made, the nibbling of the bait causes a roof of logs to fall and kill the marten. The steel trap has a pair of jaws kept open by a trigger, and when the trigger is touched these jaws snap with a stiff spring. The trap is chained to a stake or small tree. Over fifty are

set along the first ten miles of the trapper's march through the scattered woods. The first which he visits has a marten by the hind foot, the next two are untouched, the next has been set off by a squirrel. A whole row is found to have been robbed by the gluttonous wolverine. In all, the trapper secures ten marten and two mink from the fifty traps.

Each trap must be reset with the greatest care. The smell of the victim and the human smell are removed either by smoking or by rubbing the trap with the skin of an animal. The traps are then covered with a thin layer of snow, and last of all, as the trapper walks away, he sprinkles snow over his footmarks.

Suddenly in his lonely march the trapper stops and looks closely at some marks in the snow. He knows in an instant by the fresh tracks that a lynx has recently passed by. Casting his pack to one side, the trapper hurries along through the deep, soft snow. In a little while he comes upon his prey, crouching in the fork of a tree and hissing through its glistening teeth. One shot lays it low, and the trapper has not only a valuable fur, but also several good meals from its flesh.

At the end of a fortnight the trapper arrives at his cabin, well laden with his catch. There he stretches his skins and prepares for another round of his traps. Week after week this brave man tramps through the drifting snow, works through the dark days of winter, when the sun is only above the horizon for three hours, and often sleeps under a brush lean-to with the thermometer thirty degrees below zero and, possibly, the howling of a pack of hungry wolves for a lullaby. That is how our furs are won.

The trapper's holiday. When the spring arrives and the melting snow floods the little stream, the trapper prepares to carry his furs to the Hudson Bay post, two hundred miles away. The furs are packed in bales of eighty pounds, in order that they may be carried over the portages. By the end of June the river is free from ice and he can launch his canoe. The trapper's heart is glad. He is going to reap the reward of his labour, and, best of all, he is going to see his fellow-men. What cares he for those two hundred miles he must paddle his heavily-laden canoe! He may have to work his way along the edge of a seething torrent, waist-deep in the cold water, as he tows his load along. At least a dozen times his whole cargo and canoe must be carried on his back along a rough trail through the forest in order to avoid a waterfall or some dangerous rapid.

At last the trading post is reached. Many Indians with their families have already arrived, and their deer-skin tepees almost surround the buildings of the Hudson Bay Company. Down near the river are small cultivated fields, where potatoes, cabbages and turnips are growing, while a

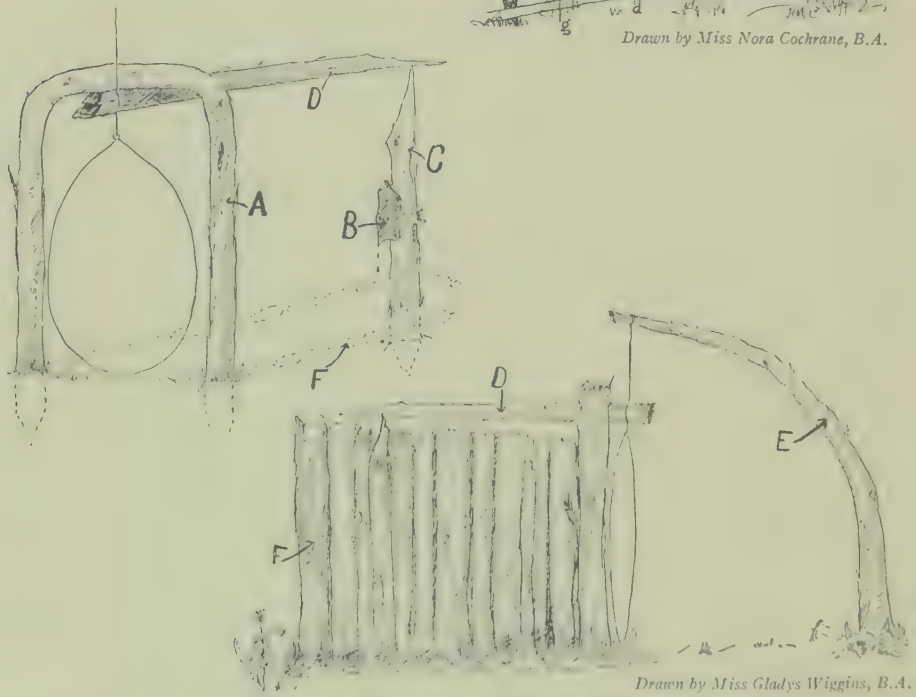
FIG. 8. HUDSON BAY POSTS IN CANADA

Why are the posts usually on rivers? How many posts on Hudson Bay are at the mouths of rivers? Why are they placed there? By what route do these posts receive their supplies and ship their furs? How many posts are on the Mackenzie River and its tributaries? What route do the furs from these posts take to London, England? With the help of Map 17 in your Atlas complete the names of the Hudson Bay Posts whose initial letters are printed on the map. Which provinces of Canada have no Hudson Bay Posts?

Drawn by Miss Nora Cochrane, B.A.

FIG. 9. AN INDIAN TRAP FOR CATCHING MARTENS AND OTHER SMALL ANIMALS

The sticks *a* and *b* are kept in place by the uprights *e*, *e*. *b* lies on the ground; one end of *a* is so buried in the gound that it lies flat along *b*. The free end of *a* is raised and kept in position by the little stick *c*, which rests delicately on the bait-stick *d*. The bait *g* is surrounded on three sides by stakes driven in the ground and can only be reached by passing between *a* and *b*. As the animal eats the bait, the bait-stick *d* is moved, the piece *c* falls out, *a* comes down on the animal, and the heavy log *f* pressing down prevents it from escaping.



Drawn by Miss Gladys Wiggins, B.A.

FIG. 10. A SNARE FOR CATCHING RABBITS

A is an elastic switch two and one-half feet long, pointed at each end, and stuck in the ground to make an arch. The bait *B* is attached to *C*, one end of which rests on the ground, and the other delicately supports *D*. The other end of *D* is attached to the wire above the loop. The wire is attached to a trimmed sapling *E* bent over. As the bent sapling pulls on the wire it presses one end of *D* against the arch, which makes the other end press against *C*. This is all enclosed by a little fence *F*, made of stakes driven in the ground, so that the only entrance is through the arch. If a rabbit had its body through the loop and began nibbling the bait, describe how it would be caught.

field of oats supplies winter fodder for the stock. All the trappers and the Indians come to the long store where the trading takes place. Its shelves are well packed with tobacco, powder, shot, guns, axes, knives, traps, scissors, needles, matches, and ornaments such as ribbons and beads. There are bolts of bright-coloured cloth to satisfy the vanity of the squaws, as well as strong blankets, warm mittens, and mackinaw coats. Bags of flour, beans, salt, and sugar are piled high across one end.

Each Indian brings in his furs, which the clerk values in terms of a beaver skin, for there is little money in the North. Then a long process of bargaining begins. The Indian wants twice as much as his furs will buy. Hour after hour passes, the Indian often changes his mind, but the clerk does not lose patience. At last all disputes about price are settled, and the Indian and his squaw pass proudly out, laden with their year's supplies and ready to begin their long journey back to their winter hunting-grounds. The white trapper is possibly more business-like, but he too is in no hurry to select his winter outfit. The weeks at the post pass all too quickly, and soon he must launch his canoe on the return voyage to his log cabin two hundred miles upstream.

The Hudson Bay Company has become noted for fair dealing. Its goods are always of the most serviceable quality, and in two hundred and fifty years the great Bay Company has never broken faith with an Indian. If an Indian has had little success in his trapping, he knows that he can get his next year's outfit on credit. The Company trusts the Indian and the Indian has faith in the Company. On the other hand, each Post Manager is a great power for law, order and justice throughout his district. The bad Indian or white man soon feels the weight of his hand.

The future of the North. Not more than thirty thousand Indians and five thousand white men live in the million and a half square miles given over to the fur trade. It is doubtful if there will be any increase in the population as long as conditions remain as they are. One family requires thirty or forty miles along a stream, and it is not always possible to trap over the same ground each year. It is well to trap over several streams in rotation, so that one Indian family may pre-empt two or three small streams which drain an area of one hundred square miles.

Yet the Northern Plain is anything but barren. The great warmth and continued light of the summer sun, which shines for twenty hours a day, clothes the more favoured parts of these lands almost magically with a mantle of grass and flowers. Other parts are covered with reindeer moss, which is good fodder for deer, caribou, and musk-oxen, which once roamed over this region in great numbers. But since the Eskimo and the Indian

learned the use of guns, their reckless killing has rapidly destroyed the herds, once a chief source of food.

Efforts are now being made to tame the musk-ox and to introduce reindeer from Lapland. The reindeer have been successfully introduced into Alaska, and large shipments of meat are yearly sent from Nome to Seattle. Perhaps the same could be done in the lower Mackenzie basin, and the reindeer might thrive on our tundra lands as far east as Hudson Bay. If such could be accomplished, then many more people could live in the far North country, as the reindeer supplies milk, meat, and clothing and gathers its own food winter and summer.

SOME OF THE PRINCIPAL FUR-BEARING ANIMALS TAKEN IN CANADA (1924).

Kinds.	Number of Pelts.	Value of Pelts.
		Dollars.
Beaver	151,913	3,081,975
Fox	157,063	4,193,812
Marten or Sable	41,504	798,688
Mink	166,331	1,663,620
Musk-rat	2,515,142	2,780,211
Otter	11,277	288,270
Lynx	29,608	620,583
Ermine	308,125	318,453
Coyote	85,858	858,895
Wolf	8,397	99,261
Bear	8,926	80,906
Total value of all furs taken (1924)		$15,441,564

Arrange these in order of value and make a graph to show their relative importance—viz. —

Fox . . . $4,193,812

Beaver . . . $3,081,975

PROJECT:—On an outline map of Canada paste in pictures of all the animals which you have learned about in this chapter.

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

In both number of skins and total value, the muskrat now surpasses all other fur-bearing animals in Canada.

Many animals' skins appear on the fur market under assumed names. Dyed muskrat and Belgian hare are called Hudson seal and French seal, while our old friend the skunk appears as Alaska sable.

Fox farming is carried on extensively in Canada, especially in Prince Edward Island. Muskrat farms have also been started.

Courtesy of New York Zoological Society.

FIG. 11. MUSK-OXEN

These animals inhabit the extreme north of Canada; their flesh is good to eat. A company is attempting to establish ranches of these animals in the summer prairies of the north.

By courtesy of V. C. C. Lynch, Director of Natural Resources Intelligence Branch, Dept. of Interior.

FIG. 12. AN EXCITING RIDE

These men are shooting the rapids at Fort Smith. Are they going north or south? How e is the Slave River at this point? Notice the size of the tree [illegible] ported up-stream past this rapid? How are the men guiding the boat?

By courtesy of the Department of National Defence, Ottawa.

FIG. 13. THE GEM OF THE ROCKIES: LAKE LOUISE

CHAPTER II

CANADA'S ICE AGE

A feathery snowflake. During the next winter storm, examine a few snow-flakes on a piece of black cloth. There each lies like a sparkling gem, regular in shape and as light as thistledown. Are such ghostly nothings capable of exerting any force? Pile one upon another and we shall see. Let the flakes fall hour after hour, and soon man, with all his might, can scarcely struggle through them, the powerful automobile is stalled, and at last the great locomotive puffs and grinds in vain as it lies helpless in a great snow-drift, with a string of cars behind it. Our little feathery snow-flake has conquered man's most massive machine.

That is nature's way of working, not in the whirlwind and the storm, but in quiet ways, so gently and so noiselessly that it is scarcely observed, but yet so steadily that in course of time mountains can be torn down, plains levelled, lakes filled, and rocky coast-lines cut into fantastic shapes.

Canada buried in ice. Long, long ago, when the surface of Canada on both sides of Hudson Bay stood up much higher than at present, the weather became colder and colder. Perhaps the rainfall, and especially the snowfall, was then also much heavier than at present. As the weather became colder year by year the increased snowfall disappeared later and later in the spring, and the first snowfall appeared earlier and earlier in the fall. At first the last snow of winter was not melted till the end of May, and the first fall came in September; then the snow clung to the surface till June and began falling again in August. These two periods came closer and closer together, till finally the winter's snow had not all melted when the first snow of autumn covered the ground. Next year still more snow would be on the ground when autumn snows began, and thus each

FIG. 14. PARTS OF CANADA COVERED BY ICE SHEETS

The arrows indicate the directions in which the ice sheets flowed.

year after this, more and more snow would be left unmelted. If only one inch of extra snow fell each year, then in one hundred years the depth would be one hundred inches, and in one thousand years it would be one thousand inches, or over eighty feet.

Something like this happened many thousands of years ago over the greater part of Canada. Labrador Peninsula and the whole region west of Hudson Bay, as well as the mountains of Western Canada, became buried in snow so deep that not a mountain peak, except in the Rockies, was able to push its head above the white mantle.

Ice that flows like water. Roofs and trees break down under the weight of a heavy covering of snow. What happened under the immensely thick snow-cap that covered Canada? Just as a snow-ball, when pressed firmly between the hands, turns into ice, so the great weight above pressed most of the snow-cap into ice, clear and blue as an opal. When the wooden covering of a barrel of pitch is cut away, the pitch, even in the coldest weather, will flatten out and flow away in every direction, as though it were a liquid; yet all the time it is as hard and brittle as ice. The ice in the bottom of the Canadian ice-sheet began to do the same. The great heaps both east and west of Hudson Bay began to flatten out, and pushed south over Ontario, Quebec, the Maritime Provinces, and extended even into the United States. They then pushed west and south over the Prairie Provinces, east over Labrador and Newfoundland, and north into Hudson Strait and the Northern Plain of Canada.

Though the heaps of ice were always flattening, fresh snow falling kept them at the same height. As the margin of the heap spread gradually into warmer regions, the ice melted and flowed off as torrents of water. Such conditions continued for thousands of years, and at last the temperature became warmer, not so much snow fell, and melting during the summer was more rapid. The ice-sheet became thinner, the edges gradually retreated backward toward the centres, and finally disappeared. Such an ice-sheet is still to be found covering Greenland, thousands of feet deep, except where a few of the highest peaks project as black specks above the thick sheet of snow and ice.

Canada polished smooth by ice. Ice, thousands of feet in thickness, pressed with tremendous force against the rock and soil beneath it. As it spread slowly out it carried along much of the loose soil. Sand, gravel, and stones, frozen in the bottom, as they moved forward were polished, scratched, furrowed, and they broke up the underlying rock. As this giant mill passed over, every pointed hill and crag was gradually rounded off and became a gentle sloping dome, and evidence of this mighty grinding

By courtesy of Department of Mines, Ottawa.

FIG. 15. A ROCK IN A DREARY LAND

How large is the rock? What is the character of the country? This rock is in Ungava Peninsula and was carried in the ice-sheet which when it finally melted left this large boulder.

By courtesy of Department of Mines, Ottawa.

FIG. 16. A RIDGE FORMED UNDER THE ICE-SHEET

This ridge of gravel is in Eastern Ontario. It was laid down by a stream flowing under the ice-sheet during the glacial period.

By courtesy of Department of National Defence, Ottawa.

FIG. 17. NORTHERN CANADA'S MOSAIC OF SILVER AND GREEN

[illegible] part of Lake of the Woods [illegible] the [illegible] the country has left [illegible] in the picture. Describe the character of the surface of the region.

is everywhere seen in Canada. A million square miles are still covered with dome-shaped hills, often called sheeps' backs, because of their fancied resemblance to the backs of a distant flock of sheep. Wherever rocks have been protected from decay by soil, on its removal scratches and furrows made by ice can be seen as plainly as though they were cut yesterday. In some cases the scratches are as delicate as though made by fine emery-paper, in others furrows a foot deep are gouged from the solid rock, so great was the force of this mighty plough.

Canada's soil carried from north to south. Before the glacial period, as this cold time is called, the northern parts of Canada were probably covered with as thick a layer of soil as the southern. This great mass of ice, slowly but steadily forcing its way towards the south, pushed soil and loose rocks before it, or dragged them under its great weight. In time the hills and even the hollows of the north were scraped clean, and the mixture of clay, sand, gravel, and stones was deposited farther south as a mantle of soil. When the ice finally disappeared, it was seen that the fertile plains and alluvial river valleys of Northern Canada had been converted into bare rocks and naked river gorges.

Farms from ice. Let us try to picture what was taking place at the southern margin of the great ice-sheet. Near the edge it was so heavily laden with clay, sand, gravel, and stones, that it was hard to tell whether it was ice or earth. Turbid streams rushed forth full-grown from under the melting mass, and dropped along their shifting channel coarse stones, gravel, and sand in layers, and these to-day are being dug up in many parts of Canada and used to put on roads and road-beds of railways. The ice, constantly pushing forward, built up around its rim a ridge of clay, sand, gravel, and stones, called *boulder clay*. If the ice margin remained long at one place, this ridge, called a *terminal moraine*, was broad and high. If the margin melted rapidly, only a small amount of boulder clay was built along the front. Thus were produced a succession of irregular hills and hollows. Accordingly to-day we find the southern part of Canada covered with boulder clay, laid down in hills and hollows, and often ridges can be traced for many miles, but usually these hills and hollows are so irregular that they give the country a rolling character.

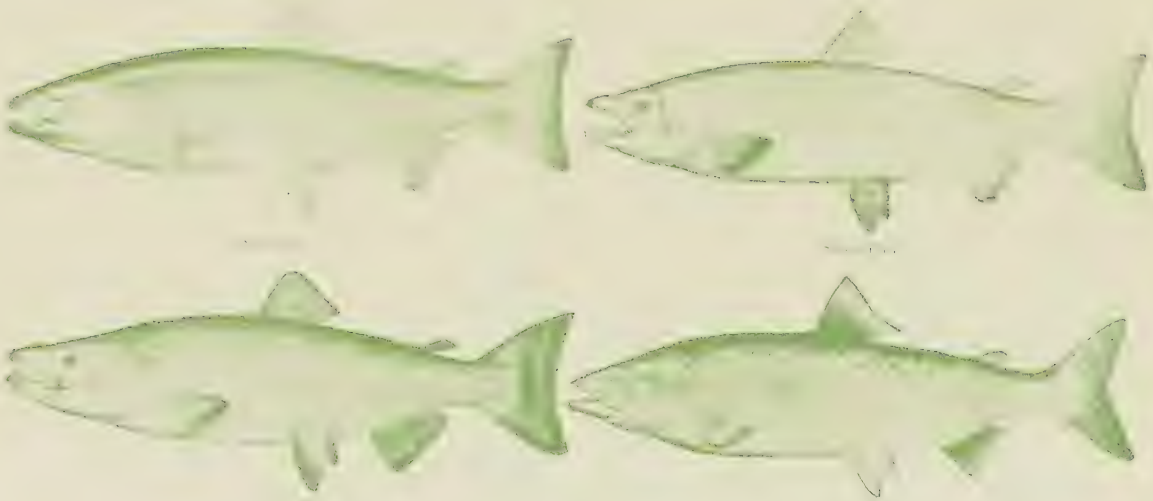
The ice-sheet thus transported its soil to Southern Canada, but unfortunately much of this was carried from Northern Canada, which thus was left bare and barren. Indeed, still more unfortunately for Canada, much of our good Canadian soil was carried farther south to make the fertile fields of New York, Ohio, Michigan, and Wisconsin. In most parts the soil deposited from the ice contained stones, which had been broken from the

bed rock and then carried many miles (Fig. 15). Many an early settler in Canada spent his life clearing away these stones, which still try the patience of farmers as they plough their land.

Rivers destroyed, lakes created. Before the glacial period the rivers of Canada were very different from what they are to-day. As the ice-sheet spread out, it filled every river and mountain valley, dropping, as it melted, great dams of boulder clay across the river valleys, and especially across the lower ends of mountain valleys (Fig. 13). These held back the water that tore down from the melting ice and which later collected from rainfall, and caused it to gather in pools and lakes. Consequently the whole surface of Canada to-day is dotted with lakes of all sizes and shapes (Fig. 17), and it is said that half of the fresh water of the earth is collected in these countless lakes of Canada. In the mountains of British Columbia they occupy long valleys with frowning rocky slopes on three sides and with a low dam of boulder clay bounding the fourth, over the lip of which the water is drained away (Fig. 13). Such are the beautiful lakes Okanagan, Arrow, and Kootenay, as well as numberless little gems showing waters of the purest emerald green, indigo blue, and many shades of red, which attract hundreds of thousands of tourists every summer to the western mountains. In Eastern Canada our Great Lakes, as well as many others, occupy old river valleys, which have been dammed by boulder clay.

The birth of a river. All the old river-courses were more or less filled with the ice-sheet. When it retreated, the water had to find new river channels over the ridged and furrowed surface. Water collected in every hollow, then overflowed at its lowest lip, and tumbling down over the irregular land in rapids and waterfalls, reached another hollow, only to fill it and again to overflow. Finally, after a tortuous course, the river reached the sea. The filled hollows were lakes, the connecting streams, often a succession of rapids and waterfalls, became rivers. Such are the rivers in most parts of Canada to-day, and thus were they formed. If one follows a river in Northern Ontario or Quebec, it will be found a succession of lakes connected by turbulent and tortuous streams containing rapids and waterfalls. The St. Lawrence is the best example of such a river.

Lakes with shores of ice. The ice-sheet, after it had retreated from the south, stretched as a dam across the lower St. Lawrence, the rivers flowing into Hudson Bay from the south, the Nelson River, which drains Lake Winnipeg, the Saskatchewan, and Red River. With the flow of these rivers to the north cut off, the water collected in great lakes along the southern margin of this great dam of ice. The water rose high enough to overflow to the south. One such lake, due to the damming of the Nelson River, and



Coho

Humpback

By courtesy of United States Fish Commission.

Fig. 18. Spring, Sockeye, Coho and Humpback

How many fins has each fish on its back? How many on the underside? The average weights of the four kinds are: Spring 22 pounds, Sockeye 5 pounds, Coho 6 pounds, Humpback 4 pounds.

By courtesy of Ca

FIG. 19. SALMON-FISHING AT THE MOUTH OF THE FRASER RIVER

How many boats are on the fishing grounds and what is their size? How many masts have they? How many men are in each boat? What are the [illegible] black objects floating on the water? Notice the large white buoys at the end of each row. Is the land in the distance low or mountainous?

called Agassiz, occupied much of Southern Manitoba, Saskatchewan, and the adjoining parts of the United States. Another, due to the damming of the rivers flowing into James and Southern Hudson Bay, called Ojibway, occupied Northern Ontario and Quebec. A third, due to the damming of the St. Lawrence River, called Algonquin, was formed by Lakes Superior, Michigan, and Huron joined together. For thousands of years sediment washed down by the rivers settled in the bottoms of these lakes. After the ice-barrier had melted, and the water again drained to the north, these lakes either disappeared or shrank in size, and their old lake bottoms are now plains almost as flat as the sea, and covered with a fat soil many feet deep. To-day these are Canada's most fertile fields. The western prairie is the bed of Lake Agassiz, the Clay Belt in Northern Ontario and Quebec is the bottom of Lake Ojibway, and the most fertile lands of Southern Ontario, and the plains of the St. Lawrence in Quebec, are composed of the sediments of the enlarged Great Lakes and St. Lawrence River.

Canada's surface moulded by ice. Thus we see what wonderful changes the great ice-sheet worked on the surface of our country. Our lakes full of fish, our rivers full of waterfalls so useful for power, our rolling land in the south, our scratched and polished dome-shaped hills in the north, our fertile flat plains occupying old lake bottoms, our beautiful scenic lakes in the mountains, as well as numberless other interesting features too difficult to explain to boys and girls, are all products of the great ice-sheet that buried Canada many, many years ago.

Things to do. Can you find near your school any stones or rocks which have been scratched or grooved by a glacier? In which direction did the ice move? Are there any glacial hollows filled with water? Here is a list of some of the great lakes in British Columbia. Many of them have been caused by glaciers. Find them on your map. Make a similar list of lakes in the Prairie Provinces, and of those in Ontario and Quebec. You can find their areas in the *Canada Year Book*.

	Area.		Area.
Allin Lake	331 sq. miles	Quesnel Lake	147 sq. miles
Babine ,,	306 ,, ,,	Okanagan ,,	135 ,, ,,
Kootenay Lake	220 ,, ,,	Tacla ,,	135 ,, ,,
Stuart ,,	220 ,, ,,	Shuswap ,,	124 ,, ,,
Chilko ,,	172 ,, ,,	Teslin ,,	123 ,, ,,
Arrow ,,	163 ,, ,,	Harrison ,,	122 ,, ,,

Added together, the larger lakes of British Columbia cover an area of 2,439 square miles.

In all Canada we have 120,300 square miles of fresh-water lakes, which is over half of the area of fresh-water lakes in the world.

Try to make a list of all the uses of a lake.

CHAPTER III

THE LIFE OF MRS. SOCKEYE SALMON

THE SALMON FISHERIES OF BRITISH COLUMBIA

Let each member of the class examine, or bring to class, as many different labels as possible taken from salmon cans. From these labels find the names of the different kinds of salmon, the colours of the flesh, and the towns in which the salmon is canned. Find these towns on Map 23 in the Atlas, and note on which river each is situated. Is the top of the can soldered on? Are there any holes in the top stopped with solder? By scraping find what covers all parts of the can. Why is this put on? On Map 23 find Lakes Quesnal and Babine. By what rivers are they drained? How many miles does a salmon, born in one of these lakes, travel in order to reach the sea?

Baby Sockeye. My first name is Sockeye. You may think that I was given this name on account of my eyes, but they had nothing to do with it. In the good old days before the white man came to hunt me to death, the Indian used to call me *sauqui*, which meant "best of fish," and the white man changed *sauqui* to "sockeye." My second name is Salmon, one of the most respectable family names in the whole fish kingdom.

I was born in beautiful Lake Babine in central British Columbia, and the first thing that I remember is that I was lying in among the small stones near the shore. I saw thousands of others like myself resting quietly at the bottom. I was then very different in shape from what I am now. A large bladder-like sack, full of food, was attached to the underside of my body, and as this sack grew smaller and smaller I grew larger and larger. When at last it was all gone I felt hungry for the first time in my life and began to search for food.

Those early days were full of danger. Even before some of my brothers and sisters were born, fierce wide-mouthed creatures, called trout, gulped them down by thousands. Many a time I barely escaped from the snap of their jaws. Still I loved the clear, cool water of the broad lake, with its tall, snow-capped mountains on either side.

My thrilling trip to the sea. When I was a year old I began to feel uneasy and to have a desire to swim away from Lake Babine. I felt a force driving me in the direction in which the water flowed. As the current at first was very weak, I moved along slowly, but in time the current increased, and I loved to let it bear me along. Once I happened to come near the surface, and behold! I was no longer in the lake, but in a swift stream,

FIG. 20. A GOOD CATCH

Salmon being unloaded at a New Westminster cannery. How many tons load the salmon when taken from the nets? What is the weight of the fish? How do the men handle them? Do they appear to be dead or alive? Can you tell how many fish are on the barge.

By courtesy of Canadian Pacific Railway.

FIG. 21. WHERE SALMON BY THE MILLION ARE CANNED

This scene is near New Westminster. Name the river shown. Map 23 in Atlas. What use is made of the water? Describe the boats of the salmon and explain their uses. See preceding page.

gloomy, with steep rocky banks on each side (Fig. 24). Going down-stream I had the greatest fun of my life. The journey was full of excitement. Now the water flowed quiet and deep, now again it whirled me along so fast that I had to steer carefully with my broad tail lest I be battered against the rocks. Soon I was in a larger river, which the white man calls the Skeena, and this became wider and wider as I swam down-stream. After many days I reached a point where the current slackened and the banks of the river were very far apart (Fig. 22). As I drew the water over my gills it tasted differently from the water in the lake and river, for it was a little salt. At last there was no land to be seen, the water that flowed over my gills was quite salt, and I knew that I was in the great ocean.

Mrs. Sockeye's blood relations. I have now been in the ocean for a whole year, and have seen many wonderful sights and have had many narrow escapes. I have found many of my brothers and sisters, also called Sockeye. But there are three or four relations of mine which are called Salmon but not Sockeye. There is that handsome fellow, Mr. Quinnat or Spring Salmon (Fig. 18). He is the largest and strongest of us all. Though his flesh is generally as red as mine, sometimes, when nobody would suspect it, his flesh turns out to be white. Indeed, occasionally, the flesh on one side of his body is white and on the other red. He prides himself that he is born far away up the mountains in the pure, cold water of the tiny streams from the melting snow and ice, and of course that is something to be proud of. We Sockeyes despise Mr. Coho Salmon (Fig. 18) and Mr. Chum Salmon, for instead of their flesh being a beautiful red like ours it is only pink. The smallest of all my relations which I met in the sea were the Messrs. Humpbacks, who fairly swarmed everywhere, but as they also were only pink and their flesh was soft, they could never associate with Mr. Spring and myself.

Deadly traps in the ocean. I am now over three years old, and for almost two of these I have been swimming in the sea. My friends say that I am larger, stronger, and handsomer than any other Sockeye of my age. But I have learned to avoid many dangers.

Often in my younger days as I swam my snout struck against a network of cord hanging vertically in the water (Fig. 19), but my body was so small that it easily passed through the meshes of the net. However, I decided to keep away from all such nets, as I noticed hundreds of my brother Sockeyes drowned in the meshes, for their gill-covers, when caught in the cord, were no longer able to keep the water flowing over the gills. These nets were lifted from time to time, and if my friends who were caught were still alive, they were cruelly struck on the head by a club from a man's hand. They

were then tossed into the bottom of a boat. Men called such nets *gill-nets* (Fig. 19). I decided when quite young never to try to get through a net, but always to swim away from it.

Once I had a very narrow escape. I was swimming near the surface with thousands of other Sockeyes, when suddenly I heard a puffing noise, and came to the surface. A net was being let out into the water from the back of a boat, which moved in a great circle around us. Before I had time to think, the boat had come close up to me, and I, with thousands of others, was inside the net, as shown by the floats on the surface of the water. No matter in which direction I darted, my snout always struck the hated net, which was getting smaller and smaller, and within which we were becoming so closely packed that we could hardly swim. I dived deep into the water, but found that the net had been drawn together at the bottom. We were now packed so closely that the water was spraying over us. In one last frightened effort I gave a jump into the air, and luckily for me, I found myself outside the net. All the other Sockeyes were caught and lifted into the boat by means of a great dip-net. I often heard men call such a net a *purse-seine*.

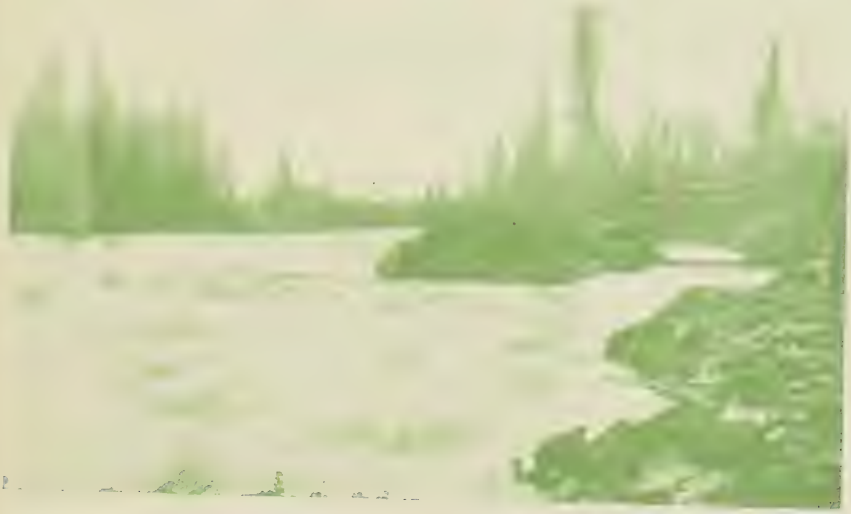
One day I saw a very unusual sight, which almost cost me my life. In front of me a bright object gleamed through the water—in fact there were no less than four of these beacons—which flashed like a little fish in the sunshine. Something always compelled me to follow anything that flashed brightly, and I darted forward. As I gained on them, the objects flashed more and more and seemed to be spinning round. Soon I was upon them, and snatched at one. Alas, I was caught in the mouth by a sharp hook. I felt myself being drawn forward and upward by the line, which I could plainly see. In spite of the pain I struggled hard, but in vain. As I came near the surface I saw a boat with poles sticking out from each side and two lines from each pole. A man was pulling me in. With every muscle in my body I gave a final lurch. The hook ripped through my mouth, but I was free. I had learned my lesson, though with much pain. Although I afterward saw many shining bodies like that first one, and often saw my poor brothers and sisters caught by the hooks of the *trolling-lines*, I never desired again to follow such dangerous flashes.

The cruel fate of my brother Sockeyes. I often wondered what was done with the Sockeyes and Cohoes caught in the purse-seines, the gill-nets, and on the trolling-lines. One day I met an old Sockeye, who was able to tell me all. He had been caught in a purse-seine and after many adventures escaped. He told me that he was thrown from the boat with thousands of others into a scow (Fig. 20) and rapidly towed to a building

By courtesy of Canadian National Railways.

FIG. 22. CANNERIES LINE THE SKEENA RIVER

What is the character of the land along the river? How many canneries can you count? How far apart are they? Describe the buildings. Why are they built on the shore of the river? Why is there a wharf along the side of each? Of the two nearest buildings one is the cannery, the other the houses in which the Chinese and Indians and their families live. In which do the people live?



By courtesy of British Columbia Fisheries Department.

FIG. 23. A LADDER FOR SALMON TO CLIMB A WATERFALL

At the head of this river is a lake in which the salmon lay their eggs. Notice the waterfall at the left. Since salmon cannot readily jump this fall, many were unable to reach the lake until the canal on the right was made, in which there is a series of small falls up which the fish are able to leap.

By courtesy of Canadian National Railways.

FIG. 24. INDIANS ON A BRANCH OF THE SKEENA RIVER HOOKING SALMON

Describe the banks of the river. How are the platforms attached? How are the fish caught? What is the use of the club in the Indian's right-hand? What kind of current has the river? Why do salmon swim close to the shore in such a current?

By courtesy of Canadian National Railways.

FIG. 25. A WICKERWORK TRAP FOR CATCHING SALMON

As used on a branch of the Skeena River. It has a funnel-shaped opening through which it is easy to enter but almost impossible to escape.

called a *cannery* (Fig. 21), which was built over the water. A man, by means of a fork, pitched the fish on to a sloping platform, along which cross-pieces sliding upward pushed them forward and dumped them on the floor. The old Sockeye, trembling yet at the thought of what he had escaped, told me that as he lay there waiting for his turn, he saw his companions pitched one by one into a big iron machine, which scraped off the scales, cut off the fins and head, split open the body, and took out the insides all at the same time. The fish, as it came out of the machine, was cleaned with a spray of water and carried up until it was just below a row of sharp knives which came down and cut it into pieces all of the same length. Another machine rammed these pieces into round tin cans. The cans were then moved into another room where tops were soldered on. Then he saw a sight that made him shudder even yet when he thought of it, though he knew that all of his companions were dead before they had been packed in the cans. A car, loaded with hundreds of the sealed cans, was wheeled into a metal oven and the door closed. Then scalding-hot steam was passed into the oven for more than an hour. Now the cans of salmon were ready to be labelled, packed in boxes, and shipped to all parts of the world.

Mrs. Sockeye longs for her birthplace. After hearing the story of the terrible fate of my friends, I became more cautious than ever. Day and night I was always alert to avoid the sly traps set by man.

I had now been in the sea for about three years and had passed through many dangers. But still I was happy in the free life, and thought I should never wish to leave the blue, salt water. But I was mistaken. A strange longing to go back up the river, whence I had entered the sea, took possession of me. But how could I find it? Following my strong impulse to swim to fresher water, I soon found myself battling once more against the currents of the Skeena River. My whole nature seemed to change. I had no desire to eat, but only to push at full speed up-stream, and I rushed through the seething torrents with ease, and I even leaped up waterfalls of some height (Fig. 23). As though I had not enough trouble in overcoming the current, my old enemy—man—was ever lying in wait for me. If I hugged the shore to avoid the swift current, there he stood on a platform with a spear or a net in his hand ready to pierce me through or scoop me up (Fig. 24). If the river narrowed, he set many kinds of traps (Fig. 25), but in my eagerness to get back to my birthplace I avoided every attempt on my life.

At last I was back in the great lake near my birthplace. I sought out a shallow spot, where my mate had scooped out a hollow in the gravel for a

nest, and here I laid thousands of eggs and covered them with sand and fine stones.

Now I felt that my life was done. My body was bruised and bleeding, my flesh, formerly so plump and firm, was now thin and flabby; I had no desire to eat or swim, not even to live, but just allowed the current to carry me wherever it would.

. . . . . .

The next morning there was found floating on the surface of Lake Babine the body of the largest Sockeye salmon ever seen in that district.

Herring and pilchard. The table at the end of the chapter will show you that there are many fish other than salmon which are caught in the coast waters of British Columbia. Two of these are the herring and the pilchard. They are caught in nets or purse-seines near the shore. The herring run in vast shoals during the months from November to March, and as they follow the shore-line in and out of the bays the fishermen catch tons of them at a time. When the seine boats or scows are loaded they run for harbour, and there the herring are mostly dry salted. That is, they are thrown into bins and covered with coarse salt. After ten days the bins are opened and the solid mass, herring and salt, is shovelled into large boxes. Thousands of tons of this salt-pack herring are shipped to Japan and China. The Chinese like to eat these salt fish with their rice. It saves buying salt and provides a welcome change to a diet of straight rice and vegetables. Then too the salt-packed fish will keep for a long time in a hot climate. Nanaimo, on the east coast and the sounds on the west coast of Vancouver Island are the centres of this industry. There are salteries at Kildonan, San Mateo, Kyuguot, and several other places.

Sometimes the herring are smoked, and are then known as kippers. Are there any kippers on sale in your grocery store? Where did they come from?

The *pilchard* is a little larger than the herring, but soft and oily. Large schools frequent the sounds and inlets of the west coast of Vancouver Island during the months of July, August, and September. They are taken by the scow-load to reduction plants at many of the fishing ports. There they are pressed and the oil is extracted. The residue is made into fish meal, which is used as a food for poultry and stock. Some of it is used as a fertilizer.

The *halibut* is the most difficult fish to catch. It is a bottom feeder, and lives in deep water on gravelly "banks." Some of these banks are one hundred fathoms deep. Long lines are laid by the fishermen. These lines have short baited lines attached at intervals of four or five feet. Pieces of herring are used to bait the hooks, so that it is a case of set a fish to catch a

By courtesy of Department of Naval Service.

FIG. 26. HARPOONING A WHALE OFF THE COAST OF BRITISH COLUMBIA
Notice the gun for shooting the harpoon on the prow of the whaling boat. The whale has just been struck and is diving.

By courtesy of Canadian National Railways.

FIG. 27. PRINCE RUPERT, THE GREATEST FISHING TOWN IN BRITISH COLUMBIA

[illegible] difficult to make? How do the houses differ from those of your district?

ish. After the line has been down for several hours the fisherman locates the buoy-marker and hauls it up over the stern of his dory. The halibut are thrown into the bottom of the boat, the hooks are rebaited, and the line is let down for another catch.

The halibut banks are found in Dixon Entrance, Hecate Strait, and around the north end of Vancouver Island. Power vessels take the fish to Prince Rupert, where there is a huge freezing plant. It is one of the largest of its kind in the world and can hold fourteen million pounds of frozen fish. Four vessels may unload at once, and thirty thousand pounds of fish per hour have been received at this great plant. The halibut are packed in wooden crates and placed in refrigerator cars, which are sent to towns on the prairie, as far south as Chicago, and to the large cities of the New England States and eastern Canada. There is danger at present of the halibut banks being over-fished, and a Commission is at work investigating this. We should not catch too many each year, or some day we shall find that there are no more halibut.

Whales are the largest of all animals. They live in the sea, but are warm-blooded and must come to the surface to breathe. They are found all along the coast of North America in the cold waters from Vancouver Island northward, in Bering Strait and the Arctic Ocean, and eastward to Labrador and Newfoundland. Two whaling stations, Rose Harbour and Naden Harbour, are in operation on the British Columbia coast during the summer months, when quiet seas make it possible to hunt the whale. Small, stout vessels, looking much like tug-boats, outfit from Victoria each spring and go north in April or May to their stations. In the bow of each is a harpoon gun, and the picture (Fig. 26) shows the gun in action. When struck the whale "sounds" or dives deep down into the ocean, while hundreds of fathoms of line run out over the pulley. By and by the whale comes to the surface and thrashes around in its death agony. The whaler draws alongside, rescues the harpoon, inserts a tube into the whale's body, and blows it up with air, otherwise it would soon sink. After several whales are killed, they are gathered together, lashed alongside the ship, and towed to port. There they are hauled out on shore and the layer of fat or blubber is taken off and the oil rendered out in vats. The bones are ground up into bone meal and the carcass is cooked and made into a valuable fertilizer called whale guano. A large whale may represent a value of as much as 2000 dollars when fully prepared for market. Some years as many as four hundred and fifty whales are towed into Rose and Naden Harbours. People say that it is not hard to find either of these whaling stations, even on a foggy day. I wonder why?

When the white men first came to British Columbia they found that the Nootka and Haida Indians were fearless whalers. It was a great day in the village when the canoes brought in a big whale. Everyone crowded down to the beach and hacked and cut the blubber into strips. The women and children carried the slippery pieces to the big houses, where it was cooked and the oil skimmed off into wooden boxes. Then they feasted day after day, and from house to house. There were dances and songs, and everyone was smelly, oily, and happy. When the edible parts were all gone, the braves hoped for another prize.

The home of many fish. Have you wondered why so many salmon live in the waters along our British Columbia coast? The salmon must have fresh-water lakes and rivers in which to spawn. The rivers must be deep enough for the salmon to swim up to their natural spawning beds, and there must be no falls which the salmon cannot leap over. Salmon are caught all the way from the Columbia River to the Aleutian Islands, and as far south as the Kurile Islands along the coast of Asia. Find the rivers of this coast-line. Are there suitable lakes for spawning?

When the salmon come down the rivers to the sea they must find food. Now fish like shallow waters of from fifty to five hundred feet in depth. There they can feed upon the tiny marine organisms and upon the marine plants. The giant kelp beds of the Pacific Coast of America provide wonderful feeding-grounds for the salmon, and are a protection from the voracious killer whales and sea lions.

We speak of the coast from the strait of Juan de Fuca to Alaska as a *protected* coast. Is this of any advantage to the growing salmon? If you add all the shore-lines of the islands and the inlets along the British Columbia coast they will amount to fourteen thousand miles. Is this any advantage to the salmon, and to other fish as well?

Cool waters produce fish whose flesh is firm and hard, so that we are able to can these fish, and when the can is opened the flesh is still firm. Such fish as the herring can be salted and exported to far-away places, while the halibut may be frozen and sent to far markets. There are many fish found in the waters of the West Indies and around the islands of the East Indies, but the flesh is so tender it will not stand canning or transportation. It quickly grows soft and thus deteriorates. The people of Western and of Eastern Canada are fortunate to have such wonderful fishing-grounds provided by Nature. If we use these grounds carefully and wisely we shall always have fish to eat and plenty to sell to other people not so favourably situated.

Here are some figures which relate to the fisheries industry of British Columbia and the rest of Canada by provinces. Can you make a graph showing the provinces in order of value from the production of fish? You may fill in a circle or use a series of parallel black lines as , or you may think of some other way and surprise your parents and your teacher.

VALUE OF FISHERIES BY PROVINCES FOR YEAR 1925.

Data.	Value in dollars.
Prince Edward Island	1,598,119.00
Nova Scotia	10,213,779.00
New Brunswick	4,798,589.00
Quebec	3,044,919.00
Ontario	3,436,412.00
Manitoba, Saskatchewan, and Alberta	2,420,325.00
British Columbia	22,414,618.00
Total	$47,926,761.00

Arrange the following in order of value:—

VALUE OF EACH KIND OF FISH CAUGHT IN CANADIAN WATERS FOR YEAR 1925.

	Dollars.		Dollars.
Salmon	15,760,630	Haddock	1,171,555
Sardines	1,017,206	Clams	290,063
Halibut	4,185,391	Pike	278,369
Pickerel	1,056,169	Perch	180,497
Lobsters	5,552,977	Sturgeon	201,227
Smelts	1,035,504	Oysters	185,353
Cod	6,232,821	Hake and Cusk	295,720
Trout	1,097,728	Black Cod	114,315
Herring	3,117,841	Tullibee	290,751
Mackerel	663,628	Eels	146,062
Whitefish	1,990,108	Pollock	127,415
Whales	1,100,000	Pilchard	182,911

GEOGRAPHICAL
PEPPER AND SALT

Interest facts: not to be memorized

The Trent River is the longest in Southern Ontario and the Albany in Northern Ontario.

There are seven rivers more than one thousand miles long wholly or partially in Canada: Mackenzie (2,525 miles), St. Lawrence (1,900), Yukon (1,765), Saskatchewan (1,205), Columbia (1,150), Peace (1,065), and Churchill (1,000).

Baffin Island, nearly as large as Manitoba, is the largest Canadian island.

Are you aware that the area drained by the Nelson-Saskatchewan River system is greater than that drained by the St. Lawrence with all its tributaries?

The Mackenzie River is the largest in Canada and it also has the largest drainage basin.

Very few know that McIville, near the coast of Labrador is the largest lake in Quebec.

CHAPTER IV

THE BIG TREES OF BRITISH COLUMBIA

A maze of coast waters. Nowhere else in the Western Hemisphere is found such a network of inlets as on the coast of British Columbia and Alaska. Behind a barrier of numberless islands, long, narrow bays, called canals, channels, or inlets, worm their way from fifty to one hundred miles into the Coast Mountains. Often they divide into two or three branches, like the narrow toes of a bird's foot. The dense forest, in different shades of sombre green, mantles the sloping borders right from the water's edge.

As the rocky islands along the coast form a breakwater to beat back the waves of the Pacific, and as many of the inlets are narrow—only two or three miles wide—the winds cannot greatly roughen their waters, and these inlets form ideal channels in which to raft the logs which are cut from the trees on the mountain-slopes.

Four monarchs of the forest. The forests extending along the Pacific coast as far as the north end of Vancouver Island are the most valuable in the world. Not only are the trees giants (Fig. 30), but their trunks stand so erect and so close together that sometimes they resemble a field of wheat. Amongst all the trees the Douglas fir is king. Its stem, four to ten feet across, sometimes extends two hundred feet into the air, erect as a mast. Some giants stand over three hundred feet high, and are so broad that an arch could be cut through the base wide enough to admit an automobile, and so old that they were already large when Jacques Cartier sailed up the St. Lawrence. Wherever large, strong timber is required, as in bridges, wharves, and masts, Douglas fir is used. It is just as useful for the finest trimmings, so ornamental is its grain and so beautiful its polish.

One of the most striking scenes for a visitor to the Pacific coast in earlier days was the sight of many Indians gliding through the sea in an immense dug-out canoe, fifty or sixty feet long and eight feet wide. These boats were carved from the trunks of the western red cedar. This tree rivals the Douglas fir in girth, though not in height, as it tapers rapidly towards the top. So straight is its grain and so even its texture that a few blows of an axe may split the trunk into rough boards. These were used by early settlers to build their dwellings and are, to this day, employed for roofing cabins. This cedar is so resistant to decay that logs that have lain for several hundred

By courtesy of Publicity Bureau, Vancouver, B.C.

FIG. 28. A JOB THAT REQUIRES A COOL HEAD

p, which has begun to fall.

By courtesy of F. C. C. Lynch, Director, N.R.I.B. Dept. of Interior.

FIG. 29. LIFTING TEN-TON LOGS ON TO CARS

in the picture?

By courtesy of C. L. Matthews.

FIG. 30. THE DEATH OF THE GIANT

What is the diameter of the tree? How thick is the bark? Are there any branches on the lower part of the trunk? On what are the men standing? How do their axes differ from those most commonly used? How high above the ground is the tree cut?

years in the dampness of the shady forest are still firm at the centre and some day will be cut into lumber. It is no wonder, therefore, that it is used for making shingles more widely than any other Canadian wood and also for building small boats and launches.

The giant Sitka spruce fringes the Pacific coast of Northern British Columbia and follows the borders of the inlets and river valleys, but does not extend up their slopes to a great height. It is found at its best on Queen Charlotte Islands. It is almost as large as the Douglas fir and is used chiefly in the pulp-mills. Its lightness, strength, and evenness of grain set the whole world clamouring for it during the Great War that it might make the frames of aeroplanes.

The western hemlock is also a very valuable timber tree, but it has suffered by having the same name as the inferior eastern hemlock. However, its fine qualities are becoming rapidly known.

The rain and sunshine that quicken the trees. Trees, like most other plants, grow rapidly when they have sunshine, warmth, rain, and good soil. The warm, moist, westerly winds, blowing in from the Pacific Ocean, bring a genial temperature to the coastal region during both summer and winter. As these winds blow up the sides of the Coast Mountains facing the ocean, they cause heavier rains than fall in any other part of Canada. The mild weather, the abundant rain, and the long daily period of sunshine during the summer, stir the trees to rapid growth, and it is no wonder that here are found the noblest forests in the world. The Interior Plateau, which is cut off from the Pacific winds by the crest of the Coast Mountains, has very dry weather, and cold winters in many parts. Here the forest trees are smaller and more scattered. Still farther east under the shadow of the giant Rockies, which force the rainfall from the ascending air currents, the valleys of the Upper Fraser and Columbia Rivers are mantled with rich forests.

From what you have read you should be able to answer the following questions. The maps in your atlas will also be of assistance :—

Why do trees grow so big in British Columbia? What three things are most needed for the rapid growth of plants? How many inches of rain fall on the coastal region of British Columbia? (Map 16 in Atlas.) How many inches fall on the northern corner of Vancouver Island? Does more rain fall anywhere in the world between 40 and 60 degrees of latitude than on the coast of British Columbia? (Maps 30, 37, 49 in Atlas.) Does heavy rainfall cause rapid growth of trees? In what other part of British Columbia besides the coast is there heavy rainfall? (Map 16 in Atlas.) In what parts is the rainfall light? Name the parts of the province in which the rainfall is sufficient to cause the rapid growth of trees. What is the temperature of the greater part of British Columbia during July? (Map 15 in Atlas; During January? (Map 14 in Atlas.) Is there any other part of Canada warmer during the winter than the coast of British Columbia? Does the temperature of the coast of British Columbia stimulate rapid growth of trees? Which has more sunlight during the summer months, Southern British Columbia or Southern Ontario and Quebec? Does sunlight promote

growth? Name three reasons why there are dense forests of very large trees on the coast of British Columbia.

How are the logs from the big trees got to the mills?

Here are some questions which you might try to answer before reading the story on Logging :—

What parts of British Columbia are covered with forests? (Map 9 in Atlas.) From your previous study state in which parts of the province the densest forests are found. Describe the coast-line of British Columbia. (Map 23 in Atlas.) What is the shape of the inlets? By what names are they called? How are they useful in getting out the logs? What is the most marked difference between the surface of British Columbia and that of the other provinces of Canada? (Maps 18 and 23 in Atlas.) Does the surface of British Columbia make it difficult or easy to get out logs? Are the rivers of British Columbia rapid or slow? (Fig. 20.) Have they rapids and waterfalls? Give reasons for your answer. Are such rivers the best for floating logs to the mills? Is the snowfall as heavy on the Pacific as on the Atlantic coast of Canada? Why? How is deep snow helpful in getting out logs? What makes it (*a*) easy, (*b*) difficult, to carry on lumbering in British Columbia?

Logging. To cut trees four and five feet in diameter, and to move them down steep slopes, over rocky crests, and across deep valleys to the sea, is no easy task. Since the rivers in many places are seething torrents and flow through deep, dark gorges, they are not so useful for floating logs as are the rivers of Eastern Canada. Nor along the coast of British Columbia are there the heavy snows which are so useful in Eastern Canada for moving the logs from the woods to the water's edge. Everywhere the logging railway plays the chief part in transport of the logs (Figs. 29, 33, 34). When a new limit is to be stripped of its timber, a rough-and-ready railway is laid from the sea to a central part of the limit. By axe and saw the trees are felled (Fig. 30), the branches cut off, and the trunk is cut into logs from twenty-four to forty feet long.

These logs, which are often five feet in diameter and weigh ten or fifteen tons, have to be moved from where they fall to a railway, a river, or an inlet of the sea. Formerly from ten to twenty oxen were used to drag the logs along a rough road cut through the forest. But these animals have long since been replaced by donkey-engines (Fig. 29), rigidly placed on the ground, which pull the logs by means of wire cables wound on cylindrical drums. Usually the logs are dragged along the ground by means of a cable, one end of which is attached by a pulley to the top of a high tree (Fig. 29), but sometimes they are suspended from a wire cable that extends from the railway in the valley to a suitable point on the slope. This wire cable, as thick as the wrist, is stretched between two high spars, made by trimming the branches from very large trees (Fig. 28). One or more logs at a time hanging from wheels, which roll along the cable, are moved from where they fall to the railway.

Often a *chute* made of logs is laid down a slope, and the logs slide, or are drawn, on this pathway to the railway. Occasionally a great water-tight sloping trough is erected, and water from a mountain stream is turned into

By courtesy of Canadian Pacific Railway.

FIG. 31. LICKING A SALMON CAN CLEAN

There is no more playful pet than the cub of the black bear, and in the parks of Western Canada, where bears are protected, they have become quite tame and feed on garbage from the summer hotels.

By courtesy of Canadian National Railways.

FIG. 32. ROCKY-MOUNTAIN GOAT

This very shy animal lives in the highest parts of the mountains. What colour is it? What colour are its nose, eyes, and horns? Is its fur short or long? Describe its horns. It is twice as large as a domestic goat. This is a mother with her young.

By courtesy of Canadian National Railways.

FIG. 33. THE LOGGING RAILWAY

How many logs are piled on each car? What is the distance across the end of each log? How many cars is the engine pulling? How are the logs prevented from rolling off the car?

By courtesy of Canadian National Railways.

FIG. 34. UNLOADING LOGS FROM A CAR

How many logs are being unloaded at once? Why are they dumped into the water? What is the use of the oblique poles over the railway?

this new channel, called a *flume*. The logs float or slide down this trough. One flume in the Sierra Nevadas, in California, is over fifty miles long.

The logs are brought by the railway to the sea, where they are bound together into rafts and towed by boats to the saw-mills.

Making of lumber, shingles, and pulp. The many saw-mills of the Pacific coast are the largest in the world. Hour after hour and day after day, a steady stream of logs is drawn up into one end of the mill, and a con-

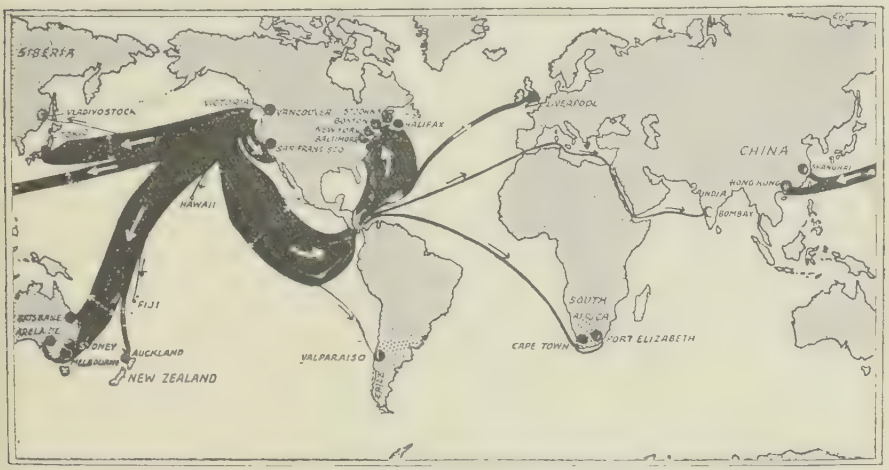


FIG. 35. BRITISH COLUMBIA IN EVERY CONTINENT

The black line represents the water routes along which lumber is exported. The thickness of the line represents the amount sent along that route. To what country is most lumber exported? At what cities is it unloaded? To what parts of the British Empire is lumber shipped? Which part takes the most? What foreign countries are the best customers? Name the ports in each country where the lumber is received. Much not shown is shipped by railway to Central and Eastern Canada and the United States.

tinuous line of lumber passes out at the other, to be piled in the great lumber yards to dry, or to be loaded on to cars or steamers for shipment to every corner of the world (Fig. 35). Over three hundred such mills are located at tide water along the coast of Vancouver Island and from Prince Rupert to New Westminster, but the largest and most numerous are near the city of Vancouver and on Burrard Inlet. There are also large lumber mills at Victoria, the capital city of the province.

Over one hundred mills ceaselessly cut the great cedar logs into millions of shingles. Six large pulp-mills at different points along the coast grind the wood of the spruce and other trees into pulp, from which is made paper for newspapers, or news-print, as it is called.

British Columbia lumber for every climate. Great steamers can always be seen at the wharves of Vancouver, New Westminster, and Victoria, loading with lumber for many parts of the world (Fig. 35). Some steam south-west to Australia and New Zealand, others either pass through the Panama Canal, or brave the storms that beat against Cape Horn in order to reach South Africa. Japan and China, with their swarming populations needing to be sheltered, are taking increasing quantities of British Columbia lumber every year. Railway ties for Egypt, house trimmings for South America, mine props, railway ties, masts, and piles for Great Britain, France, and other European countries, are all made from the timber of the Pacific coast. But still larger quantities are used nearer home. Immense quantities of lumber from the Douglas fir are shipped across the Rocky Mountains into the Prairie Provinces and Central United States, where trees are scarce and the price of lumber is high. The steady demand for lumber along the coast of California, a dry country where there are few trees, is partly met by British Columbia. Eastern Canada, though so far away, is using British Columbia lumber in ever-increasing quantities, and some of the most ornamental door panels and other room trimmings in the beautiful homes of Toronto, Montreal, and other eastern cities, are made of Douglas fir or western red cedar.

Care of forests. The forests of British Columbia are partly owned by lumber companies and partly by railways, but the greater portion belongs to the provincial Government. Over one million dollars a year is received by the Government as fees from lumbermen for the privilege of retaining and cutting the timber. As the forests of British Columbia are the most valuable in Canada and perhaps on the continent, and as only a few parts of the world have a greater supply of timber than they require for their own use, every effort is being made to prevent the waste of the forest trees. The greatest enemy is the forest fire, started, in nine cases out of ten, through man's carelessness. In one week a fire can destroy more timber than all the lumbermen of the province cut in a year. Under the genial sunshine and nourishing rains of the Pacific coast, growth is so rapid that new timber is being produced by Nature faster than it is at present being cut by man. It is thus possible with proper care to have a perpetual supply of lumber.

Hundreds of fire-rangers have their cabins scattered all over the province. Telephone wires strung from tree to tree, or lying on the mossy ground in the forest, make it possible to summon help from all directions to fight this red-tongued demon of the woods. Soon by careful organization of the fire-fighters, and by the training of men and boys not to be careless with matches, cigars, and camp-fires, the forest fire will be no longer feared, and countless millions of dollars will be saved.

By courtesy of Granby Consolidated M.S. & P. Co.

FIG. 36. COAL-MINE ENTRANCE, CASSIDY, VANCOUVER ISLAND

Can you read what is printed on the signs? How are the cars hauled out of the mine? Is it a shaft or a tunnel?

By courtesy of Granby Consolidated M.S. & P. Co.

FIG. 37. LOADING COAL INTO CARS

How is the coal carried to the cars? What size of coal is in the nearer car? In the farther one?

By courtesy of Granby Consolidated M.S. & P. Co.

Fig. 38. A car-load of coal from Granby Colliery at Cassidy, Vancouver Island, is shown on the picture. What size is this coal? What do the letters "E & N" stand for?

By courtesy of Britannia Mining and Smelting Co., Ltd.

Fig. 39. The Concentrator at Britannia Beach, B.C.

Why is it built on a side-hill? The mine is several miles back in the hills; supplies are taken up a very steep railroad and ore is brought down in buckets which are carried by a steel cable high in the air. Can you find both railroad and "aerial tram-line" in the picture?

QUESTIONS

1. If you had to build a hut in a mining camp in British Columbia and had only an axe to make the lumber, which of the trees would you use?

2. Name the different ways in which forest fires are likely to begin. How can such fires be prevented?

3. A boat is loaded at Vancouver with lumber. State what waters it passes through, the distance it travels, and the number of days it takes, if it steams ten miles an hour, to go to (a) Yokohama, Japan; (b) Auckland, New Zealand; (c) Panama Canal. Use Map 2 in the Atlas.

4. Sitka spruce is used for making sounding-boards and the wooden parts of musical instruments. Why?

5. Why is it more difficult to study the birds in the trees of the Pacific coast than in those of the Atlantic coast?

6. On the east coast of Vancouver Island no rain falls for months at a time during the summer. What effect would this have on the spread of forest fires?

7. Lumber is shipped from the saw-mills at Prince George to Alberta. Describe the route it takes.

8. Why are the Prairie Provinces good customers of British Columbia for lumber?

Problems. Things to do. How do we get our lumber to market? To what markets do we ship (a) by sea? (b) by land? Watch the papers for notice of ships sailing with lumber for Australia, Japan, Cape Town, and through Panama Canal to the Atlantic seaboard of America—and to England.

Trace a shipment of lumber to Calgary via C.P.R. from Vancouver. Why does the C.P.R. go up the Fraser to Lytton? Why does the railroad leave the Fraser at Lytton? How far from Vancouver is Lytton? What is its altitude? What range of mountains has the train passed through? What other railroad parallels the C.P.R. to Kamloops? Where does the C.P.R. go after leaving Kamloops? Where is Eagle Pass? What happened at Craigellachie in 1885? Where is Revelstoke? What river does the C.P.R. follow to get to Rogers Pass? Why was the Connaught tunnel built? How did the engineers get the railroad down to the Columbia? Where is Golden? How does the railroad get over the Rockies? What is the elevation? Make a graph showing the elevations of the C.P.R. from the table at the end of the chapter.

Is the C.N.R. route from Kamloops to Edmonton a better route than the C.P.R.? Make a comparison from the table.

The Fraser is the great highway of British Columbia. Do you agree with this statement? Draw a sketch of the Fraser River drainage basin and mark the transportation routes in red. If you lived in Prince Rupert how would you get to Edmonton? Is this route longer or shorter than the C.P.R. to Calgary?

C.P.R. Vancouver to Calgary.	Miles.	Alt.
Vancouver	0	0
Yale	102	215
Lytton	156	687
Kamloops	251	1,134
Notch Hill	300	1,685
Sicamous	335	1,147
Eagle Pass	372	1,812
Revelstoke	380	1,492
Connaught Tunnel	425	3,865
Beavermouth	457	2,430
Golden	475	2,578
Stephen	524	5,321
Calgary	647	3,425

C.N.R. Vancouver to Edmonton.	Miles.	Alt.
Vancouver	0	0
Yale	102	215
Lytton	156	687
Kamloops	251	1,134
Chu Chua	312	1,277
Blue River	403	2,243
Clemina	436	2,745
Canoe River	452	2,721
Red Pass Junction	491	3,394
Yellow Head	526	3,720
Edmonton	773	2,185

CHAPTER V

BURIED TREASURE

Countries are like people; they often become well known because of one thing which they possess, although other possessions are really more important. Over sixty years ago, most of the world heard that *gold* had been found in British Columbia, and ever since that time many people have thought that the chief industry in the province was *mining*, whereas there are at least three other industries that are more important. However, mining is of great value, not only because it gives work to many people and so produces much wealth, but also because there are hundreds of ore-deposits which have not yet been found, but which, some day, will be developed.

There are almost as many different ways of mining as there are kinds of minerals, so that it will be easier to understand if all these methods are placed in three groups :

1. **Placer** mining for gold and platinum. This is easy and inexpensive. It is carried on by "washing" sand from a river-bar in a "pan," or in a box called a "cradle." Sometimes it is done on a larger scale by digging up rich sands with a dredge or by washing down a hill with powerful streams of water. The names "dredging" and "hydraulicing" are applied to these two methods.

2. **Lode-mining.** Very few minerals are ever found free in sand or earth. Usually they are solidly fixed in rock, and sometimes several different minerals are found in the same rock. *Lode-mining* is the name given to the method of obtaining these minerals, and it is difficult and expensive. Copper ore, which usually has gold and silver with it, is common in British Columbia; so is lead, which also has some silver and a good deal of zinc in the same mine. When the ore comes from the earth it seems just like rock, and before it can be used, it must be *crushed*, *concentrated*, *smelted*, and often *refined*.

3. **Coal-mining.** Coal is a *mineral*, but it is not a *metal*, like copper or gold. It is mined in much the same way as other minerals from lode mines are mined, but there is one great difference. When coal is brought out of the mine it is ready to use, and so mining for coal is less expensive than lode-mining.

FIG. 40. THE PROSPECTOR FOR GOLD

He is examining the gravel in the bed of the creek for particles of gold. The pan is used to wash away the lighter particles of sand and the gold is left in the pan.

By courtesy of Britannia Mi

FIG. 41. A MINER AT WORK

A miner using a compressed-air hammer drill, far underground, at Britannia Mine, B.C. How does he see what to do? Where does his power come from?

By courtesy of Consolidated Mining & Smelting Co.

FIG. 42. SMELTER AT TRAIL, B.C.

Notice the "grade" for the railroad; of what is it made?

The "Big Chief" of minerals. Of all the minerals, which one is the most valuable? Many people would say "gold" at once, because it is with gold that we can always get the things we want and because gold is always worth the same, no matter how much other things may change in value. But really gold is not the most valuable; there are other minerals, such as platinum, that cost far more to buy; there are others again that cost much less but are actually worth much more to us than gold because they are more useful. Copper or tin or lead or zinc are all necessary to us every day that we live. With the help of one or other of them we are able to light our houses with electricity, to talk to our friends over the telephone, to get water by turning a tap, to keep "canned" peas or jam or milk for a long time, to paint our homes, and even to make the glass windows through which we look or the glass dishes from which we eat.

While all these minerals are of a great deal of help to us, there is one which we have not mentioned which is the most important of all. We use it to get pretty colours in our clothes and delightful odours in our perfumes; to heat our houses and to light them; to cook our meals and to flavour them; to run machinery and to make steel. The druggist uses it to fill the doctor's prescription, as does the photographer to take a picture; it helps to make explosives and, with some other things, it can be used in place of rubber. Altogether there are nearly two hundred different substances that can be made from this wonderful "Big Chief" of minerals. Have you guessed already that its name is coal?

Coal is sunlight. You all know that to make plants grow abundant sunlight and a good deal of moisture are needed; and you also know that the plant gets from the sunlight much of its food and the substance that gives its leaves and its stem their green colour. A great many thousand years ago this earth was much warmer and much more humid ("humid" is a word which means moist or damp) than it is now, so all plants and trees grew to be very large. When they died they fell and decayed on the place where they grew, and so made the soil more fertile and the next growth still richer. Year after year and century after century this went on, until these beds of decayed plants had become very thick. Then something caused the surface of the earth to shrink and to form hollows and ridges, frequently with these beds of plants in the hollows. Next, water flowed in and covered them; later on sand, rocks, and more dead plants followed, until at last all the original bed was buried and no air could reach it. Thousands of years of pressure then turned it into the hard black substance which we call *Coal*, and which we find in its original bed tightly fitted in between layers of rock and shale.

A coal mine. It is not a simple task to get this coal, for often the bed is buried deep beneath clay or rock. Usually it is necessary to find out just where the bed is and how large it is, and for this purpose the diamond-drilling method is employed. Many small holes have to be drilled from different directions to find the exact extent, course, and value of the vein as well as the presence of other veins. These holes are bored with a diamond drill, which is a hollow steel tube with six or eight diamonds set in one end. As this is rapidly turned, the hard diamonds wear a ring-like opening with a core of rock within. Foot after foot is slowly bored, and the pieces of core as they are removed are placed in a line, which shows the complete section of the rock. Every vein the drill pierces is clearly shown. After drilling for months in all directions and spending thousands of dollars, enough is learned about the veins to begin working the mine. Then a great hole is dug into the earth: sometimes this goes straight down, and is called a "shaft," and from its foot branches run out in various directions into the coal-bed. More often, however, the hole is a "tunnel" (Fig. 36) which slopes gradually from the surface to the coal. In some mines the coal is far below the surface of the earth, and the sinking of a shaft to reach it costs a great deal of money, but in others the bed starts almost at the ground, and so coal is secured there with much less expense.

A coal-miner's work. If we stand at the entrance to the tunnel we may see the miners going to work. They wear heavy clothes and rubber boots, for the floor of the tunnel is wet; fastened to their caps are small lamps, because, of course, inside the mine it is dark. These lamps are not oil lamps, but electric or "safety," so that there will be no danger of exploding any of the dangerous gases which sometimes gather in mines.

The miner finds his way down the tunnel and through the cross-tunnels until he comes to a solid wall of coal. Here he goes to work. First, with a drill, he makes small deep holes in the wall; then he packs powder or some other explosive in these holes and ignites the fuses. A few moments later a loud noise and a rush of air reach him in the safe shelter where he has concealed himself, and he knows that his "shot" has been successful. This will be repeated perhaps several times, until a number of tons of coal, varying in size from huge chunks to small bits, are ready to be hauled away.

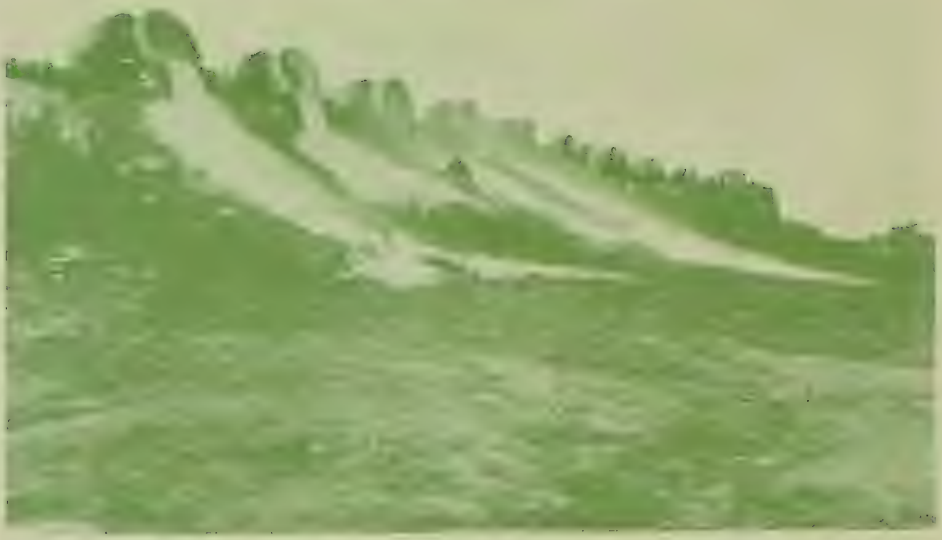
Coming to the surface. There are different ways of bringing coal out of the mine, but always it is loaded in cars, much smaller than railway cars. These are sometimes hauled by mules, but more often electric power is used and tracks are provided to let them run along more easily. When the coal is finally out of the mine, there is still a good deal to be done with it

By courtesy of Consolidated Mining and Smelting Co.

FIG. 43. CONCENTRATOR AT KIMBERLEY, B.C.
Why is it built on sloping ground?

By courtesy of Consolidated Mining and Smelting Co.

FIG. 44. ENTRANCE TO SULLIVAN MINE, KIMBERLEY, B.C.
is the tunnel?



By courtesy of Canadian Pacific Railway.

FIG. 45. DUMPING THE WASTE
This takes place at the nickel mines at Sudbury, Ontario.

By courtesy of Canadian Pacific Railway.

FIG. 46. THE GREATEST GOLD MINE IN THE WORLD.
The Hollinger Mine at Timmins, Ontario.

before it can be sold, for many different-sized pieces will be mixed in the same car; it is often very dirty, and sometimes there are pieces of slate or rock with it. So first of all the contents of the car are dumped into chutes, where the large lumps are broken up by steel rollers; next it is sorted by passing over screens with different sizes of mesh and so arranged that all "lump" size goes into one bin (Fig. 37), all "nut" size into another, and other sizes into their own particular places. Pieces of slate and rock are taken out by "breaker-boys," who pick them out by hand or by washing with heavy streams of water from a hose. Finally the coal is ready to be shipped (Fig. 38) and is loaded into cars and scows to be hauled away to the buyer.

How coal is used. Nearly all of us in Canada use coal to keep our houses warm and to cook our meals. We know, too, that a great deal is used by locomotives and steamboats to make *steam*, without which neither the train nor the boat could move. These uses are the ones which we know best, but there are others which are of great value, and of these the most important are in connection with the making of a substance called *Coke*, which is really just coal with the oils and gases taken away from it. Coke itself is used as fuel and is also necessary in smelting some minerals, particularly iron. In making coke, the gas which is released may be carried through pipes for a long distance, and then used for heating, for cooking, or for giving light. It is the "gas" which those of us who live in cities find so convenient when we want to get our breakfasts in a hurry. It is the oil from the coal, called *Coal-tar*, however, which gives us the most wonderful things. Some of them are mentioned earlier in this chapter; how many more can you find for yourselves?

Coal in British Columbia. People who live in British Columbia are very fortunate to live in a province where there is a great deal of coal in many different places. The two districts which produce the largest amounts are, on the east side of Vancouver Island with mines at Nanaimo, Extension near Ladysmith, and Cumberland, and in the Crow's Nest Pass region near Fernie. Other producing mines are at Princeton and Coalmont on the Similkameen River, at Merritt in the Nicola Valley, and at Telkwa on the Bulkley River. Besides these, there are many other deposits, which have not been developed, but which will be very valuable some day.

The world's coal. There are three chief kinds of coal: *Anthracite* or "hard" coal, the best; *Bituminous* or "soft"; and *Lignite*, the poorest. To-day Great Britain and the United States are the leading producers, and part of their coal is *Anthracite;* Germany also yields large quantities. In Canada there are three different coal districts: the eastern, in Nova Scotia; the

central, on the eastern slope of the Rockies; and the Pacific, west of the Rockies. The central field is by far the largest, but much of it is *Lignite*, although *Bituminous* is found at Lethbridge and in the Crow's Nest Pass, and some *Anthracite* around Banff.

A copper cent. Have you a copper cent in your pocket? Fifteen years ago nearly everyone in British Columbia would have had to say "no" in reply to that question, for a five-cent piece was the smallest coin in use. To-day, however, "coppers" are very common, and they are very useful too when so many things in the stores are sold for seven cents or eighteen cents or some other amount for which change could not be given in silver. Every year a great deal of copper is used in Canada to make these one-cent pieces, and much of it comes from British Columbia. How do we get it?

A "Company town." Along the British Columbia coast, almost at the edge of Alaska is Observatory Inlet (Fig. 47), and on one of its branches, Hastings Arm, is a town named Anyox. It is an odd town, not at all like most places where you and I have lived. Twenty years ago, there was nothing there except rocks and trees and hills; to-day there are houses, schools, stores, churches, streets, and playgrounds for a town of several thousand people; there is electric light, fire protection, and a sewage system. Yet the town has no Mayor and no Council. Everything belongs to the "Company," and no private person can own any land. The people who live there work for the Company, they rent their houses from the Company, and they buy what they need from the Company's store. Nobody is out of work, the wages are good, and the Company's charges for rent and for things bought at the store are reasonable, so Anyox is a prosperous town.

The "Hidden Creek" mine. All this has happened because a score of years ago a prospector discovered a huge hill of copper ore, to which was given the name "Hidden Creek" mine. When a prospector finds a deposit of ore he cannot, as a rule, develop it himself, because to do so a great deal of money is required, so he tries to get some wealthy Company interested. The Company which bought this mine had to spend millions of dollars before it could get any copper to sell; it had to build a dam and a power-house to furnish electricity for light and for running the machinery; it had to dig very deep tunnels into the mountain in order to get at the ore, and then a railroad had to be built to carry it away. But the ore as it came from the mine could not be used until it had been *smelted*, and this meant that machinery was necessary to crush the ore into fine powder, and still more machinery to work with this powder until all the valuable part had been quite secured and the refuse could be thrown away. All of this meant that a great many men had to be employed, so the Company built

hundreds of houses for them, as well as all the other buildings that are needed in a town.

In order to smelt ore, coke, limestone, and quartz are needed. This Company gets its limestone from its own quarry on Portland Canal; coke is manufactured in its own coke-ovens at Anyox from coal taken out of the Company's own mine at Cassidy on Vancouver Island (Fig. 36).

When we talk about a "copper mine," we mean a mine that produces more copper than anything else, because the ore contains other minerals as well, usually gold and silver. The mine at Anyox, which is one of the largest in the British Empire, in 1920 produced about 12,700 tons of copper, 380,000 ounces of silver, and 7,600 ounces of gold. How much would all of that be worth? You could not tell, of course, unless you knew that gold is worth 20·67 dollars an ounce; that silver, which varies in price almost as much as butter, averages about 65 cents an ounce, and that copper, which also varies, usually sells for around 14 cents a pound.

Other copper mines. At Britannia Beach, on Howe Sound, about thirty miles from Vancouver, is another great copper mine, which does not, however, have a smelter in connection with it. The ore is sent through a concentrator (Fig. 39), which crushes it and then gets rid of the waste rock. The concentrates, as the rich mineral part is called, are then shipped by boat to a smelter (Fig. 42) at Tacoma in the State of Washington.

Other important mines are at Rossland and at Copper Mountain, near Princeton, in the Similkameen Valley.

More than half of the world's supply of copper comes from the United States, the British Empire comes next with about eight per cent. of the world's total, Canada producing half of it; Japan and Chile each produce a little more than does Canada.

Copper's many uses. Out of every thousand pounds of copper that is produced only about two pounds are used to make coins. Electrical machinery and wires for carrying electricity use far more than does anything else, but a great deal is also required in the automobile industry. On ships and boats which ply in salt water copper is used in place of iron whenever possible, because it lasts much longer, and for the same reason eaves-troughs and window-screens are often made of it.

It is mixed with tin to form Bronze and with zinc to make Brass.

Paint from a mine. When was your house painted last? Where did the paint come from? It does not seem possible that the paint, which not only improves the appearance of the house but which also makes it last so much longer, came out of a mine, but it did. What kind of a mine? Did you hear the painter talk about "white lead" or "*red lead*"? A lead mine gives us

paint as well as many other useful articles. Some of these you know already, such as ammunition, pipes for plumbing, type for printing, and solder. Do you know, too, that it is used in making matches and the better kinds of glass? Automobile makers need it for batteries, which we would expect, and also for tyres; we find it in the linoleum on our kitchen floor and in the telephone on the wall; in the electric-light bulb and in the radio set; in pipe-organs and player-pianos; in footballs, baseballs, golf-balls, and tennis-balls; and even in buttons and combs.

The Sullivan mine. In 1892 a prospector named Pat Sullivan discovered a large deposit of lead-bearing ore about half-way between Kootenay Lake and Crow's Nest Pass. To-day the *Sullivan Mine* (Figs. 43 and 44), as it is now called, is the largest producer of lead in Canada, and, in addition, yields large quantities of zinc and iron as well as smaller amounts of gold and silver. Near this mine has grown up the town of Kimberley, which has a population of over three thousand people, all of whom depend on the Sullivan Mine for their living.

Trail and its smelter. The ore from the Sullivan mine is *concentrated* at Kimberley (Fig. 43), but it is not *smelted* or *refined* there. The Consolidated Mining and Smelting Company of Canada, Limited, which now owns it, has built a large smelter at *Trail* (Fig. 42), on the Columbia River, just above the international boundary line. The concentrates are shipped from Kimberley, over a branch line of the C.P.R. to *Cranbrook*, where they pass over to the Crow's Nest Branch of the same railroad. Trail is reached by another branch line running from *Castlegar*, at the foot of the Arrow lakes.

Trail, a thriving and prosperous community, has a population of seven thousand, which is steadily increasing. Many of the people who are employed in Trail live at *Rossland*, seven miles distant uphill, once a booming mining town and still a moderate producer.

Other towns. Mining, particularly of silver, lead, and zinc, is the chief industry in the south-east section of British Columbia; *Nelson* is the largest city and is a distributing centre. *Grand Forks*, on the Kettle River, was once an important smelter town; the mines which supplied its ores became exhausted, the smelter was closed down, but the development of agriculture, especially of fruit growing, has made the town more prosperous than ever. *Kaslo*, on the west side of Kootenay Lake, and *Creston*, near the south end of the same lake, are local trading centres for near-by mining and farming districts.

Gold. Canada now stands third among the world's gold producers. South Africa has a long lead, followed by the United States. In Northern

Ontario, near Timmins, is the greatest gold-field in America. The Hollinger mine (Fig. 46) rivals the greatest gold mines in South Africa. Up the coast of British Columbia, on Portland Canal, is another important gold-field. The third gold area is near Dawson, in the Yukon Territory, where the gold is not obtained from a mine in the rock, but from gravel in the bottom of old river-beds (Fig. 40). Thousands of years ago this gold was washed from the rocks and carried down by the rivers and creeks, to be dropped to the bottom wherever the current slackened.

Silver. Canada is rich in the precious metals. It stands third among the world's producers of silver as well as gold. In 1906 silver was discovered

FIG. 47. THE COAST OF BRITISH COLUMBIA FROM BELLA COOLA TO ALASKA

Locate the route of the C.N.R.

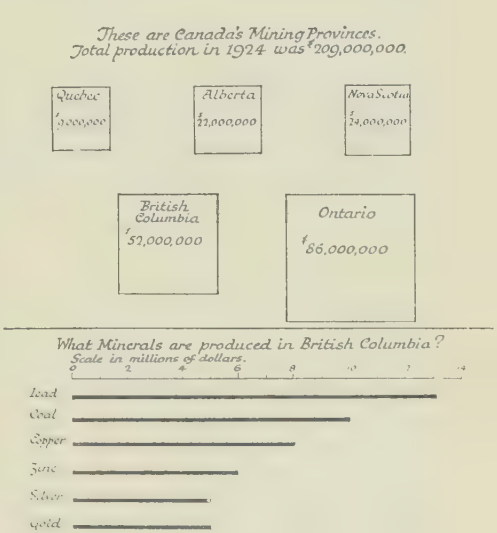


FIG. 48. CANADA'S MINERAL PRODUCTIONS

in Northern Ontario near Cobalt, which soon became one of the greatest silver camps on the continent, and it still contributes more than half of Canada's output. Silver is also secured in British Columbia near Nelson, and along Portland Canal, as well as in smaller quantities in the Yukon.

Nickel. Canada supplies two-thirds of the world with nickel. This beautiful metal was used chiefly in making armour-plate for warships, but

since the Great War there is so little building of such ships that the mine-owners have had to seek new uses for this metal, and they have succeeded so well that the industry is growing every year. Our new large five-cent pieces are made of this metal instead of silver.

Other minerals. Canada stands high in the production of other minerals as well. With cobalt and asbestos she supplies most of the world, and she stands second in the production of arsenic. The arsenic and cobalt are obtained from the silver mines at Cobalt; and asbestos is produced at Thetford Mines in Southern Quebec. Although Canada stands so high as a mining country, only a narrow fringe has yet been touched. As railways open new areas, and as we increase our wealth in order to be better able to open expensive mines, our mineral output is sure to increase by leaps and bounds.

EXERCISES

1. Canada produces many minerals not mentioned in this chapter. Some of them are platinum, palladium, rhodium, felspar, graphite, gypsum, mica, quartz, talc.

Find from the dictionary or encyclopædia the uses of each of these.

2. How could you separate a mixture of sand and sawdust?

3. Name all the articles of metal in your home, state the metals of which they are composed, and state which are produced in Canada and where.

4. I decided to build a boat. The lumber cost 150.30 dollars. I gave in payment fifteen ten-dollar ——— pieces, one ——— twenty-five-cent piece and a big——— five-cent piece. As I did not want the nails to rust, instead of using ——— nails I used ——— nails, though they were much dearer. The engine was largely made of ———. In order to have it as light as possible I had the steering gear made of beautiful white a———. The rudder was made of sheet iron, but to prevent it from rusting I had it galvanized with ———. The name was put on in brass letters, made of z——— and c———. In the engine the bearings in which the shaft turned were made of babbit metal, which is composed of t———, and c———, and antimony.

Fill in the blanks with the proper names of metals and tell which ones could be obtained in Canada and where.

5. Let us draw a map of Canada. With clips fasten a piece of tracing-paper to Map 18 in the Atlas, then with a sharp lead pencil trace the outline of Canada, also the chief lakes and rivers. Now mark on this map with a black capital "C" the places where we get coal, with a brown "C" the copper mines. In the same way, show where other minerals are found.

GEOGRAPHICAL
PEPPER AND SALT

Interest facts: not to be memorized

Nine-tenths of the natural gas of the world issues from wells in the United States; Canada and Poland run hard for second place.

Canada's most valuable mineral is coal, of which she produces fifty million dollars' worth annually, gold stands second with a production of thirty-six million dollars' worth.

By courtesy of Harold Fleming.

FIG. 49. A DAIRY FARM IN BRITISH COLUMBIA

What breeds of cattle can you see? Name the kinds of trees you can see. Why is there a fence? Is this land easily cleared?

FIG. 50. BOYS' AND GIRLS' JERSEY CALF CLUB EXHIBITING AT THE CHILLIWACK B.C. SCHOOL FAIR.

These calves cost $125.00 or more each at six months of age.

FIG. 51. A BIT OF THE "OKANAGAN-CARIBOO TRAIL" BETWEEN PENTICTON AND SUMMERLAND

By courtesy of Horticultural Branch.

FIG. 52. ORCHARDS NEAR VERNON, B.C.

Can you see the big irrigation ditch running along the side of the mountain?

CHAPTER VI

A VISIT TO A DAIRY FARM

Bill and Jessie were ready to start at eight o'clock. Dad had the car at the door and off they went. It was a bright, warm day, and in the back seat was a mysterious lunch which Mother had finished packing just before they left. They had been looking forward to this trip for days. On Monday night an argument had started about milk and where it came from, and Dad had promised that on Saturday he would take them to a dairy farm near Chilliwack (*see* Fig. 241 *of the Senior text*), where they could find out everything they wanted to know. It was seventy miles from Vancouver, but the roads were good, so they knew they could get home before dark.

Half-an-hour later they had passed through *New Westminster* and were crossing to the south bank of the *Fraser River* on the top deck of a long, narrow bridge. Just below them smoke was rising which, their Dad said, came from a Canadian National train on its way to Vancouver. From the end of the bridge they drove, on a wide-paved road, past farms and woods until they came to *Cloverdale*. Here they left the pavement, which they had already found out was the *Pacific Highway*, and turned on to a good gravel road. For nearly an hour one farm after another appeared, some with large barns and houses and herds of fine cattle, and others with tiny houses and only an acre or two of cleared land. Now and then a small village was seen, and at last they reached *Abbotsford*.

A few miles farther on the country changed and became much more level, with fewer trees. Bill was the first to discover, from advertisements along the road, that this was the old bed of *Sumas Lake*, which had been drained and protected from floods by dykes. As they drove along they saw a great field of hops, and a little later a number of men threshing clover to secure the seed. By this time they were getting hungry, so when Jessie discovered a shady spot near a creek, the car was stopped, and Mother's big basket of lunch quickly became empty. They seemed hardly to have started again when Dad turned off the road, and drove up a lane to a big white house.

"This," said he, "is Mr. Mellon's farm. He has one of the best dairy herds in the Fraser Valley."

Mr. Mellon was at home, and gladly showed them over his farm,

First he took them out to the pasture to see his Holstein cows (Fig. 49), pointing out on the way fields of hay, corn, and mangolds, which, he said, would all be needed to feed the stock during the winter. Then they came back to the barns and stables, which were all spotlessly clean. It was too early for milking, but Mr. Mellon showed them the electric milking machine, and explained that the British Columbia Electric Railway Company not only ran a railway from Vancouver to Chilliwack, but also provided power for the farmers of the district.

"How does your milk get to Vancouver?" asked Bill.

"Only part of mine goes there," answered Mr. Mellon, "for the farmers produce far more than all the people in Vancouver drink. We milk twice a day, and some is put in ten-gallon cans, which we haul in our truck to the railway station. There it is loaded on the milk-train and taken to the city, where the Dairy collects it and delivers it to you. The rest of our milk is put through a separator, which takes out the cream; this we send to the *creamery* at Chilliwack, where it is made into butter. The 'skim milk' is fed to the calves and pigs."

"When we were in *Ladner* last summer we saw a milk factory. Is that a creamery?" asked Jessie.

"No, that is where they make condensed milk," was the answer. "You see, we have so much milk that we use it in many different ways, and one way is to take a good deal of the water out and then put the remainder in tin cans so that it will keep for a long time. On your way home you may see another *condensery* at *Abbotsford*, while at *Sardis* they make powdered milk."

"I never heard of that," said Bill, so Mr. Mellon explained that it was milk with all the water taken out, and that trappers and prospectors found it very convenient because it was so light to carry.

By this time it was four o'clock, and though they were still greatly interested, they said, "Good-bye," and began the journey home. On the way their father explained to them that the Fraser Valley was such an excellent dairying district because it had soil which the river had washed down from the mountains during thousands of years, and it also had a mild climate with plenty of rain, as a result of being so close to the ocean. He told them too that there was a great deal of dairying carried on by the farmers near Victoria, by those on the islands in the Gulf of Georgia, and up in the Okanagan Valley as well. "And, in spite of all that," said he, "the people of British Columbia produce less than half the butter they eat."

Just then they reached New Westminster.

"I want an ice-cream cone," announced Bill.

"So do I," said Jessie

Fig. 53. The Main Irrigation Canal at Oliver, B.C.
How wide is it?

over to another hill. This picture shows how it is done. How high is the wooden siphon?

By courtesy of Department of Agriculture, Victoria, B.C.

FIG. 55 A CROP OF ONIONS NEAR KELOWNA, BRITISH COLUMBIA
How many sacks can you count?

Le Blond, Vernon, B.C.

FIG. 56. AN ORCHARD SCENE IN THE OKANAGAN VALLEY
How many boxes can you see?

When the cones were finished, Dad dryly remarked, "Perhaps your ice-cream explains why so much of our butter comes from the Prairies and New Zealand."

Growing fruit without rain. Pat Forsyth lives on a *fruit-ranch* in the Okanagan Valley (*see* Fig. 247 *in Senior text*). He thinks it is a beautiful place to live in, for it is usually warm in summer, it is cold only occasionally in winter, and it scarcely ever rains. The lake water is so warm that he can go swimming from May until October, and in the fall he goes shooting pheasants and ducks with his father. He lives just three miles from *Oliver*, and goes there to school. Sometimes there is a baseball game at *Oroville*, just a few miles away in the United States, and last August he went to the "fair" in Vancouver. His father drove him to *Penticton*, at the foot of Okanagan Lake, and from there he travelled over the Kettle Valley railroad.

Mr. Forsyth's farm is on the "Okanagan–Cariboo Trail." This is one of the best roads in British Columbia; it starts at the Columbia River and follows the old route of the early fur-traders away north to Quesnel and Prince George. Pat has often driven over part of it; the ride he likes best is along the west side of Okanagan Lake from Penticton (Fig. 51), through *Summerland* and *Peachland*, to *Kelowna*, which is on the east side of the lake and is reached by a ferry. Some day he hopes to go on to *Vernon*, and even as far as *Armstrong* and *Enderby*.

The farm seems small, for it is only ten acres, but it keeps them busy to look after it all. Six acres are planted with trees—apples, cherries, peaches, plums, and apricots; this year three acres have cantaloupes and tomatoes; and in the rest, just near the house, Pat has a little garden of his own, where he is "trying out" such things as peppers, cucumbers, and sweet potatoes. They are doing very well too, and when he sells them in the fall he expects to have several dollars for himself.

Summer is their busiest time. Cherries begin to ripen in June, earlier than anywhere else in British Columbia, which means that they get a good price for them. These have to be picked quickly, so that they will not spoil, and shipped to cities at the coast or on the prairies. Right through the summer picking of fruit (Fig. 56), cantaloupes, and tomatoes goes on, and Pat has very few spare moments.

In the winter, when the sap is out of the trees, they are *pruned*, which means that some of the branches are cut out so that those which are left will grow better. This has to be done carefully, so it takes a good deal of time. When spring comes, which is usually early in March, the vegetable ground has to be ploughed and harrowed to make it ready for the young plants, and then these have to be set out and regularly cultivated to keep

the weeds down. The fruit-trees, too, need attention; insects attack them, and to prevent the fruit being injured *spraying* must be done several times.

There is one thing more, and this Pat finds most interesting of all. Have you stopped to think how it is possible to grow so much fine fruit in a place where there is very little rain? A few years ago this district had the same wonderful soil and bright, warm sunshine, but scarcely anything would grow; now they raise splendid crops, because they have found a way to get water as well. This way is called *Irrigation*.

The British Columbia Government built a dam at the end of a lake, so that the water which comes in spring could be stored up until it was needed in the summer. From this dam a cement ditch (Fig. 53), so wide and deep that a canoe could easily float in it, runs for miles along the side of a hill above the land which is to be irrigated. Smaller ditches, called *flumes*, run from this big one down to the fields below, and there the fruit-grower takes charge and sees that the water is directed where it will do most good.

Early in the summer the dam is opened and water is allowed to run down the ditch, and a schedule is arranged showing on what days each farmer can use it; this is necessary because water is precious and must not be wasted. When Mr. Forsyth's turn comes, both he and Pat become very busy. They plough furrows between the rows of trees in the orchard and around the trees too; in the field of vegetables they see that paths are provided between the rows. When the water starts to run, it has to be carefully watched, so that everything will get enough and that nothing gets so much that it is injured, and this means that someone has to attend to it occasionally at night as well as during the day. Usually they are able to irrigate several times during the summer, but this depends on the amount of water that has been stored up in the lake.

Other fruit districts. Oliver is not the largest or the most important fruit district in the Okanagan, but it is one of the newest, and it is interesting because fruit ripens earlier there than in most other places. Further up the valley at Penticton, Summerland, Naramata, and Peachland the same things are grown in much the same way, but in the district surrounding Kelowna and Vernon farmers grow fewer soft fruits, such as peaches and apricots, but more apples and, in the lowlands, large quantities of tomatoes and onions (Fig. 55). Dairying is increasing in importance in the two latter places. Armstrong is best known for its celery. Enderby is the centre of a prosperous mixed farming area.

Much fruit, particularly berries, is grown in the lower Fraser Valley, near *Mission* and *Hatzic*, and in the south-eastern part of Vancouver

Gordon Head District, Vancouver Island, British Columbia

What crops are grown? What other farm product is raised? Are the farms large or small? Why?

By courtesy of Horticultural Branch.

FIG. 58. AN OKANAGAN FRUIT-PACKING HOUSE

How are the apples carried to the packers? Can you read the printing on the end of a box. What does a box of apples weigh?

Island. In the latter area *Gordon Head* and *Keating* (Fig. 57) are noted for their strawberries.

Creston, near the head of Kootenay Lake, is another small fruit centre, as is also *Terrace*, on the Skeena River.

Mixed farming in the Cariboo. Six years ago Dorothy Bellamy and her twin sister, Beatrice, came to live in their new home on the historic old Cariboo Road. Their father had pre-empted one hundred and sixty acres of land, and had brought his family up from Vancouver. The girls were just six years old.

Their first house was made of logs (Fig. 59), and had only one room, one door, and one window. It was small and rather dark in winter, but it was warm and snug, and they could get all the firewood they wanted right outside the door, by cutting down trees. To-day that house is a cattle-shed, and they live in their new one, which has four rooms, plenty of windows, a real brick chimney, and is built of lumber.

Most of their land was in "bush," but fortunately about twenty acres was an open meadow, and here they were able to grow hay to feed their four cows during the winter. Each year, however, Mr. Bellamy has cleared several acres, and now they raise more hay than they can use, as well as oats and potatoes. The four cows have increased to twenty; they have also two teams of horses, nearly fifty sheep, a dozen pigs, as well as hens and turkeys. Most of the things they eat are raised on their own farm, but there is one thing the girls long for; there are no apples. They planted a few trees themselves some years ago, but each spring a heavy frost killed the blossoms, and last winter was so very cold that in the spring they found the trees were dead.

Their school is nearly three miles away, and only ten children go to it, all of whom live nearly as far away as Dorothy and Beatrice do. For a year the school had just six pupils, and for that whole year not one of them was absent. Has your school as good a record as that? All of these children lived more than two miles away, and sometimes in winter they had to walk through a foot and a half of snow, with the thermometer thirty degrees below zero. They often get a ride, however, for a great many people drive on the Cariboo Road.

Life on the farm is a busy one. Before leaving for school in the morning and when they return in the evening they help to milk the cows. In the summer the garden vegetables and the field of potatoes have to be hoed several times, sheep have to be herded, for there are coyotes in the hills and young chickens and turkeys need constant care. Then, just as in the Okanagan, their fields must be irrigated, for there is little rain in the

Cariboo. There are no large irrigation systems there, however, but each farmer, who has a creek running through his land, gets water to his crops as best he can. Sometimes it cannot be done at all, and then it is hard to raise very much.

Quesnel is the nearest town, and there are bought most of the things they need. Quesnel is built where the *Quesnel River* joins the *Fraser River*, and is the trading centre for a large district. It has a creamery and receives cream not only from farmers round about, but also from those for quite a distance south. Sixty miles to the east is *Barkerville*, which sixty years ago was known all the world over for gold, and which, even to-day, is producing some of that precious metal.

When Mr. Bellamy first came to his farm he travelled up the Cariboo by automobile stage from *Ashcroft* to Quesnel, passing through *Clinton*, *Lac la Hache*, *Williams' Lake*, and *Soda Creek*. Now it is possible to make the trip by the Pacific Great Eastern railroad, which runs from *Squamish* to Quesnel. Since this railroad has been built many new people have come to the country, most of whom have started farming near the railroad or the Fraser River, or along the *Blackwater*, *Chilcotin*, and Quesnel Rivers.

There was a time when mining for gold was almost the only industry in the Cariboo. This is no longer true. There is still gold-mining, especially around Barkerville and Quesnel and *Horse Fly* Lakes, but there is also some lumbering, while agriculture, particularly mixed farming, is still more important.

Other mixed-farming districts. If you will take a map of British Columbia, find Prince Rupert on it, and then trace the Canadian National railroad from that city to Yellowhead Pass, you will be locating a great mixed-farming area. This country is divided into three main parts, as it follows the valleys of three rivers.

The *Skeena* Valley, which comes first, has most of its good land along its chief tributary, the *Bulkley*, where hay, oats, wheat, and cattle all do well. *Smithers*, *Telkwa*, and *Hazelton* are leading towns.

The *Nechako* river (Fig. 65), with the hundreds of smaller rivers and lakes which drain into it, is the second area. Many farmers have already settled here, especially near *Stuart Lake*, *Fraser Lake*, *Burns Lake*, *Francois Lake*, *Ootsa Lake*, and *Vanderhoof* (Fig. 60), which is the largest town in the valley.

Prince George, the largest city in central British Columbia, is at the junction of the Fraser and Nechako Rivers. The country for many miles around is fairly well settled, and is devoted largely to mixed farming. East of Prince George, along the "*Upper Fraser*," there is much timber,

By courtesy of Horticultural Branch.

FIG. 59. A SETTLER'S HOUSE IN THE BULKLEY VALLEY

What are the walls made of? How is it roofed? Not all pioneer homes are as well constructed as this.

FIG. 60. NEAR VANDERHOOF IN THE NECHAKO VALLEY

What kind of grain is shown? How tall is it?

By courtesy of Canadian National Railways.

FIG. 61. THE GARDEN OF BRITISH COLUMBIA

This is farm land in the Fraser Delta. What is the nature of the surface in the distance? What is one of the chief farm products? From this barn what would you judge as to the amount of crop grown? How many buildings can be seen? For what is each used?

and at present lumbering is the chief occupation. As the land is cleared, agriculture naturally follows, and in a few places good farms already exist. The presence of timber shows us that there is abundant rainfall for crops.

Grain and cattle. Not all of British Columbia is west of the Rocky Mountains. Up in the north-east is a country which slopes towards the east and which is really part of the central plain. It is drained by a great river, and from that river it gets its name, the Peace River district. It is best suited for the kind of farming that is found in Saskatchewan and Alberta, so grain is the leading crop.

Some of the Peace River land is in Alberta. In British Columbia the best known area has a peculiar French name, *Pouce Coupé*, which means "Cut Thumb," and it is in this section that most of the settlers live. It is a long way from a railroad, so the absence of an available market makes it unprofitable for farmers to grow large amounts of grain.

Where is the *Chilcotin River?* The valley which it drains is our best cattle country. It has plenty of open land where grass grows in abundance, so it is easy to secure ample feed. It is one part of the province where the "cowboy" and the "round-up" are still to be found.

EXERCISES

1. Suppose the school doctor said that you were "underweight." What could you buy at the stores to make you grow heavier — the grocer's, the butcher's, the drug-store, the dairy, the fruit-store?

2. Turn to Map 23 in your Atlas. With clips fasten a sheet of tracing-paper over the map, and trace the boundaries of British Columbia and the chief rivers and lakes. Take out the white sheet and mark on it all the places mentioned in this chapter. Mark your own home too, and find out how you would get from home to each place.

3. What things would you like best for Christmas dinner? Make a list of them all and then find out where they come from.

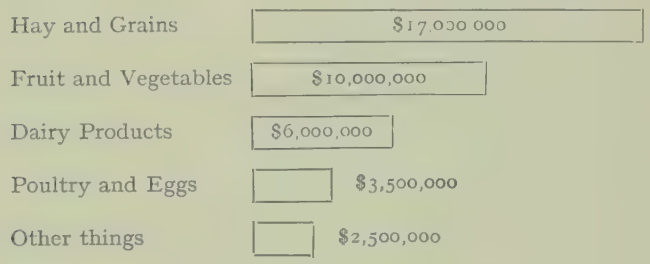
4. If everything you eat had to be raised within twenty miles of where you live, what could you have for breakfast, for dinner, and for supper to-day?

5. Here are some good things to eat that are sold in British Columbia stores; what are they and where do they come from? Caviar, anchovies, dates, pomegranates, cranberries, lobsters, raisins, olives "nigger-toes," pineapples, salt, sardines, asparagus, grape-fruit.

6. How many apples are there in a box? Get an empty apple-box at the fruit store and try to find out by reading everything that is printed on it. If a box of apples sells for $2·50, what is a fair price for a dozen, and for a pound?

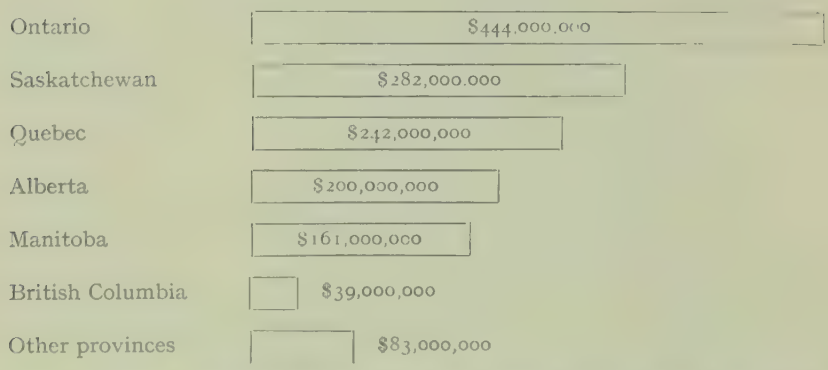
WHAT BRITISH COLUMBIA FARMS RAISED IN 1924

Total $39,000,000

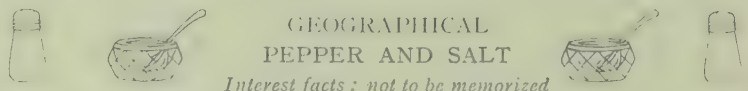


CANADA'S AGRICULTURE IN 1924

Total $1,450,000,000



These figures are from the *Canada Year Book*. Make similar diagrams for last year's crops.



GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

About one-fourth of the land of Canada is fit for farming, but only about one-sixth of this amount is at present tilled.

Hay is the most valuable field crop in all the Canadian provinces except Manitoba, Saskatchewan, and Alberta, where of course wheat leads.

Canada grows more bushels of oats than she does of wheat, but the value of the wheat is far greater.

Canada now stands second in wheat production, and first as an exporter of wheat.

Among the chief producers Belgium has the highest yield of wheat per acre, and Australia has the lowest.

Saskatchewan raises most horses and turkeys, British Columbia most goats and rabbits, and Ontario most cattle, sheep, swine, hens, ducks, and geese.

Quebec produces more than one-half of all Canadian maple-sugar and syrup.

Ontario now leads Quebec in the growth of tobacco.

FIG. 62. TWO GREAT BRIDGES ACROSS THE FRASER RIVER

Describe the banks of the river. Is the current swift? What is the nature of the country here? Which is the longer bridge? Which is the higher bridge? One bridge belongs to the Canadian Pacific Railway, which runs from Montreal to the west side of the river, the other to the Canadian National, which comes from the north to the east side of the river.

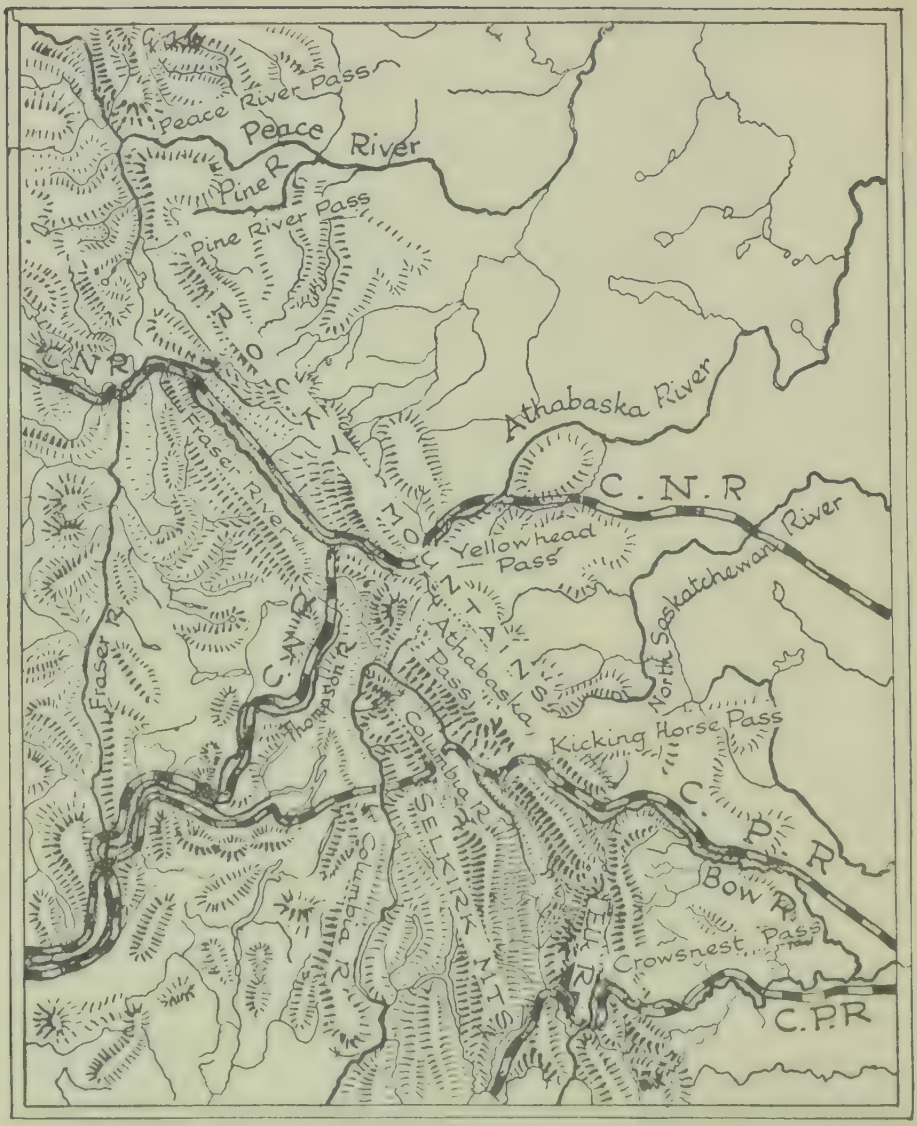


FIG. 63. PASSES THROUGH THE ROCKIES

Find six passes marked on the map. What river enters each pass? Which have railways through them? The following are the heights of the passes: Peace River, 2,000 ft.; Pine River, 2,850 ft.; Yellowhead, [illegible] ft.; Kicking Horse, 5,332 ft.; Athabaska, 6,025 ft; Crowsnest, 4,459 ft. How do the heights change from south to north?

CHAPTER VII

THE THROAT OF THE ROCKIES

THE YELLOWHEAD PASS

What is a pass? "Father," said Donald, who is in the sixth grade at school, "did you ever see a pass in a mountain?"

"Yes, my boy, I have gone through the Yellowhead Pass in the Rockies several times, once in 1890 on horseback, when I was searching for gold, and twice on the Canadian National Railways."

"Why do we have to learn a definition of a pass in school, Father?"

Mr. Keith was puzzled for a minute and then said, "I will answer your question by asking another. What has been done in order that heavy loads can be carried over the hill running across the road near the school?"

"Why," said the boy at once, "the road bends a little to one side as it comes near the hill in order to avoid its highest part, lying directly in front."

"That is correct, my boy, but something else has been done."

"Yes, I know," replied Donald eagerly. "Many hundreds of loads of earth have been removed from the higher parts of the road to the base of the hill."

"Now, imagine that hill growing until it is two miles instead of one hundred feet high, and twenty miles instead of six hundred feet across, and you then have a mountain nearly the size of those in the Rockies. Next imagine a great gap cut across it like the one in the hill, and you have a picture of the Yellowhead Pass."

"Is this pass as straight as the road through the hill?" asked the boy, full of wonder.

"No, Donald, it is anything but straight. It swings from side to side like the windings of a river."

Who dug the Yellowhead Pass? "Father, was the Yellowhead Pass ever high like the road before the cut through the hill was made?"

"That is a good question. Yes, the winding gap of the Yellowhead Pass, three miles wide and four thousand feet deep, was once filled with solid rock, and the long lane that now opens before the traveller was not there."

"Well, Father, who cut through this pass? Surely men did not remove the earth and rock on wagons, as they did from the gap in the hill?"

"No; there are not enough men in the whole of Canada to have done that, but two giants much more powerful have been at work gnawing out that gap through the mountains. Look at that map. What do you see winding through the pass?" (Fig. 63.)

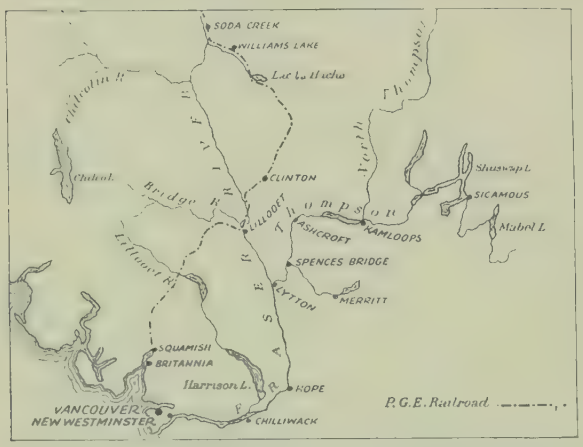


FIG. 64. The South-western section of British Columbia and the lower Fraser river. Locate: (*a*) The Cariboo Road; (*b*) C.P.R. route; (*c*) C.N.R. route.

"I see nothing but two small streams, one running east and one running west. They carry down water, but they do not carry down earth and rock, do they?"

"When I travelled through the pass for the first time, Donald, I drank the water from those streams, and at times it was almost white with sediment. Once I allowed a pailful of it to stand over-night, and in the morning the bottom of the pail was covered with a layer of mud. As every pailful transports almost a spoonful of mud, and many millions of pailfuls flow down in a year, do you not think these rivers might in time carry down a good deal of earth?"

"Well, Father, I never thought before how much work a stream can do; why, it can work as fast as a thousand horses, and it never stops night or day. So these small streams are the two giants?"

"Yes, this whole pass and almost all others are eroded by running streams."

Are passes useful? "Father, are passes of any great use to people?"

FIG. 65. This is a map of Central British Columbia. It shows the upper stretches of the Fraser river and also the beginning of the Peace river. Find on it (*a*) the route followed by Alexander Mackenzie "from Canada by land," (*b*) the route of the C.N.R.

By courtesy of Mr. C. A. Matthews.

FIG. 66. CALGARY: THE GUARDIAN OF KICKING HORSE PASS

Find this city on Map 22 in your Atlas. What river flows through the city? Is the site of the city [illegible] the city? How many pass west from the city?

By courtesy of Mr. C. A. Matthews.

FIG. 67. EDMONTON: THE GUARDIAN OF THE YELLOWHEAD PASS

[illegible] What is the character of the surface around Edmonton? Are there trees in this city?

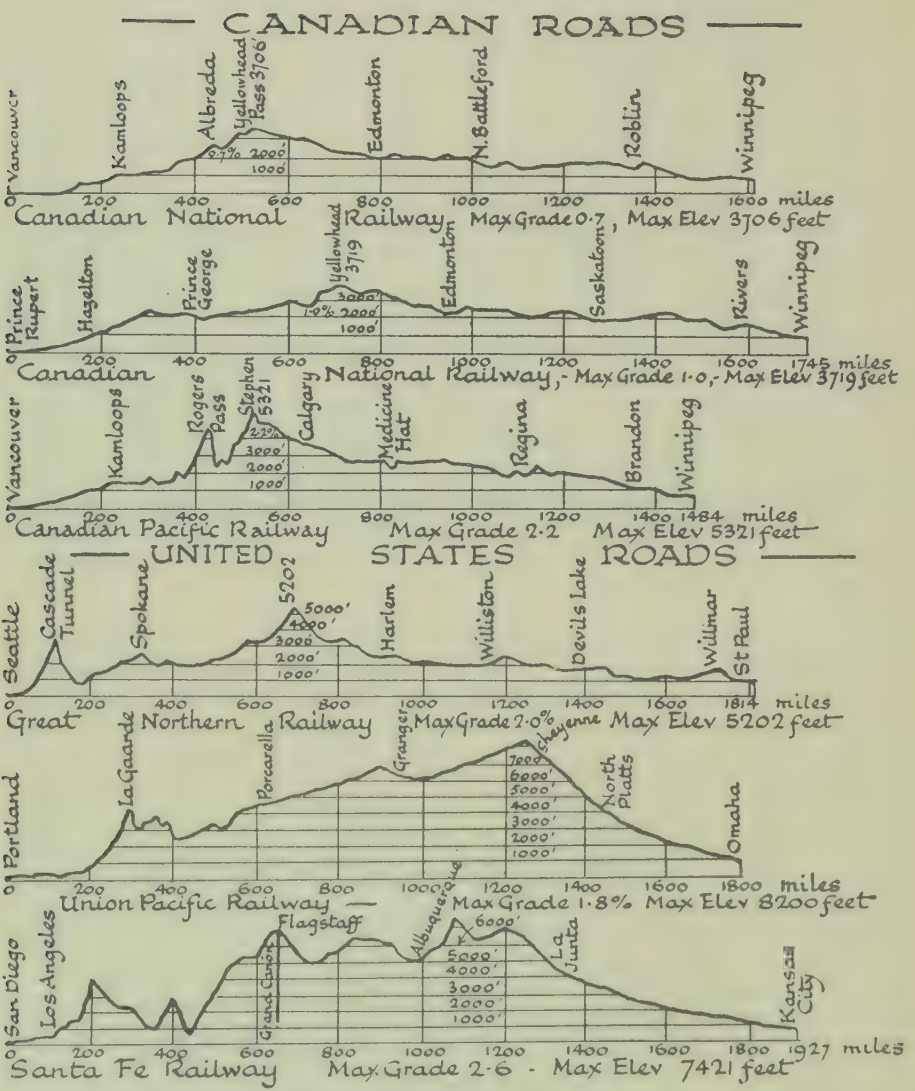


FIG. 68. THE GRADES OF TRANSCONTINENTAL RAILWAYS

The distances along the base line of each are in miles, the heights of the horizontal lines are in feet. What is the distance from Winnipeg to Vancouver via C.P.R. and via C.N.R.? What is the distance from Winnipeg to Prince Rupert? What is the greatest height along the C.N.R., the C.P.R., and along the three chief United States railways? What is the maximum grade on each railway?

"That is a very thoughtful question, and I shall try to answer it. Mountains are great barriers. The animals to the west and east of the Rocky Mountains differ considerably. This is true even of the birds, which have evidently found this high mass difficult to pass. The robins, meadow-larks, and flickers of British Columbia are quite different from those of the prairies. Indeed, such light and airy particles as seeds have found its high ridges too great a wall to climb over, for many of the trees and other plants on opposite sides of the mountains are of different species.

"When seeds and birds are separated by this ridge, so are men. For many years British Columbia was almost cut off by the mountains from the rest of Canada. It is true the Indians long knew of the Yellowhead and other passes and used them as gateways to British Columbia. Later, when the trader came, the bales of furs, each worth a fortune, were carried along this and other passes to the east. But only when the railways crept up through the passes (Fig. 63) did this, one of Canada's finest provinces, begin to advance."

"Father, if there were no passes, could railways be built across the Rockies?"

"That is exactly the point I was coming to," said Mr. Keith. "If there were no passes, a railway, or even a road, could scarcely be built across a high range of mountains like the Rockies. Even if one were made, the cost would be so great, and the gradient so steep, that it could only be run at too great expense to pay its way."

"How does the gradient make a railway more expensive to run?" asked the inquisitive Donald.

"That can be well illustrated from the Yellowhead Pass. The Canadian National Railways built both their great transcontinental railways through this pass because it is so low. As a result this line has great advantages over every other railway that crosses the Rocky Mountains. Look at the pictures here of the Canadian National and Canadian Pacific Railways (Fig. 68). The latter selected the Kicking Horse Pass, which, though farther south than the Yellowhead Pass, is more than sixteen hundred feet higher. As the Canadian Pacific has to haul every freight train over this high ridge, its gradients in both directions are much steeper, and its engines cannot draw so many cars as can those of its more favoured rival, which runs through the Yellowhead Pass. The same number of men are required to manage a train, whether it is long or short, but the steeper the gradient the more fuel is used, therefore the Canadian National has a great advantage over the Canadian Pacific in hauling freight through the mountains, and all because that railway went through a lower pass."

"I have been reading in the papers, Father, that much of the wheat from the Prairie Provinces may soon be shipped to Vancouver. I should think this low pass would give the Canadian National a great advantage over the Canadian Pacific for this purpose."

"Yes, my boy, I think you're right. Although the Canadian National crosses the mountains much farther north than the Canadian Pacific, nevertheless its route across British Columbia to Vancouver is a few miles shorter. Further, its gradients are much lower, not only through the Rockies, but also across British Columbia, and therefore it should be able easily to compete with its great rival, which has had almost forty years' start of it.

"Now, Donald, my boy, I am going to ask you a question. When I was in school we used to learn the names of all the high peaks, but not the names of the passes. Which are more important to man, the peaks or the passes?"

This made Donald pause and think. He had heard of the splendours of giant Mount Robson, of the beautiful whiteness of Edith Cavell, and of the many tourists who flock to see these glories in the summer. A chum of his had stopped at Banff, and told him of the equally sublime mountain peaks near Kicking Horse Pass.

"Well, Father," he said at last, "I think the peaks are just about as important as the passes."

"Suppose," said the father, "great volcanoes broke out near both these passes, blew to atoms the peaks, and filled up the passes with lava, volcanic dust, and mud, then which would people miss more, the peaks or the passes?"

"Well," said Donald, "the people would no longer flock by thousands to see these great peaks, and all the money they spend on their tours through Canada would be lost."

"But," said his father, "British Columbia contains half a million people, and what would they do with their chief entrances to the rest of Canada barred? Vancouver would begin to shrink, Prince Rupert would pine and die, and every town and village in the interior would be cut off, to a great extent, from the whole of Eastern Canada. Moreover, the rest of Canada would also suffer. The fresh salmon and halibut in the shops would be dearer, or absent altogether, the Prairie Provinces could no longer get lumber easily to build their houses and barns, and apples from British Columbia would no longer be seen in the stores of Edmonton, Calgary, Toronto, and Montreal. Thousands of businesses all over Canada would be ruined."

When Donald saw that he could not stand up for the peaks after this attack he said, "Well, Father, you have convinced me of the importance of passes, and I now see that they are far more important than peaks. Are there passes in other mountains as well as in the Rockies, and are they as important as the Yellowhead Pass?"

"Yes, the Alps in Europe have several passes that have been great highways of traffic for thousands of years. Almost all mountains have these passage-ways, and usually important towns have grown up at each end as a result of the traffic that passes along these busy arteries. The history of the world would be very different from what it is if the mountains were without passes."

QUESTIONS

1. Do rivers in passes have gentle currents or are they swift and filled with rapids?
2. Which railway is likely to carry more wheat to Vancouver, the Canadian National or the Canadian Pacific? Give reasons.
3. Why are the railway lines which pass through the Prairie Provinces more direct than those through British Columbia?
4. Is the winter snow deep in the Yellowhead and Kicking Horse Passes? Give reason for your answer.
5. Why is it usually cheaper to carry goods by steamer than by railway?
6. Name two important towns in Alberta near the entrance of the Yellowhead and of Kicking Horse Passes.
7. Why have Toronto and Winnipeg become great cities? On what expanse of water is Toronto? (Map **20** in Atlas.) Name six large American cities on the Great Lakes that can be reached by boat from Toronto. How many railway lines enter Toronto? What railway lines run from Toronto to Sudbury? and to North Bay? If goods were being shipped by railway from Western Ontario to Western Canada, would they pass through Toronto?
8. In what direction do the railways from Alberta and Saskatchewan turn as they enter Manitoba? (Map **22** in Atlas.) Why? Why are the railways running east and west not deflected to the south of Winnipeg? On what two rivers is Winnipeg? How many railway lines enter the city?

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

The tiptop point of Canada is Mount Logan in Yukon, which is 19,850 feet high.

Mount Carleton (2,630 feet) is the highest point in New Brunswick, and a point near Cape North on Cape Breton Island (1,500 feet) is the highest point in Nova Scotia.

Duck Mountains (2,600 feet) are the highest in Manitoba, and the Cypress Hills (4,243 feet) are the highest in Saskatchewan.

The highest point in Southern Ontario is the village of Dundalk (1,704 feet) and the highest point in Northern Ontario is Tip-top Hill (2,120 feet), north-west of Lake Superior.

CHAPTER VIII

"MY DIARY"

April 15th, 1927. How dark and cold it is! I am lying out here alone, covered with an inch of soft, dark soil. I cannot see the sun or the sky, or any of my brothers. The ground is cold and damp. I wonder how long I must be like this.

Still, it might be worse. There are no weeds here, for John Rowe, who owns our farm, is very careful. Last fall he ploughed this field so that the weeds were all buried deep. Then, a month ago, he drove all over it with a disc harrow, up and down and then across, to make the soil loose and soft. A day or two later he harnessed his team to the seeder, and soon thousands of us were in the ground waiting for the sun and the rain to help us grow.

Mr. Rowe's farm is in the *Peace River* district, not far from *Grande Prairie*. Spring will be late coming here, because it is so far north, but I know that I am still alive, though my head is not above the ground yet. I must try to be contented. I am good wheat, for Mr. Rowe got me from Herman Trelle at Wembley, and last year his seed won First Prize at a World's Seed Show at Chicago.

May 18th. What a difference! I am so busy growing that I have no time to think of my diary. My head is several inches above the ground, and other heads are so thick around me that I can only see an inch or two. The days are bright and warm, and they are getting longer all the time. We have had nice heavy rains two or three times, and afterwards I could almost feel myself grow. Good soil is the only other thing I need, and the soil here is as good as any in the world.

Last night Mr. Rowe and his neighbour, Axel Hansen, walked through our field. I heard Mr. Rowe say, "I tell you, Axel, fifteen inches of rain in a year may not seem much at Vancouver, but it is enough here to grow a mighty fine crop of No. 1 Hard."

"Yes," answered Axel, "it's enough, if it comes at the right time."

I wonder what he meant by "the right time."

May 24th. To-day is a holiday, and we seem to be the only workers anywhere around here. Mr. and Mrs. Rowe had a picnic for their friends and people came from as far away as *Spirit River* and *Peace River* and even from Pouce Coupé in British Columbia. After lunch was over some

By courtesy of Canadian Pacific Railway.

FIG. 69. CUTTING GRAIN ON A LARGE FARM IN SASKATCHEWAN

How many binders are at work? How many horses are on each binder? Notice how level and treeless the prairie is.

By courtesy of Canadian National Railways.

FIG. 70. THRESHING AT PORTAGE PLAINS, MANITOBA

Is the grain stacked before it is threshed? What is being done with the grain? Will trees grow on the prairies?

By courtesy of Department of Immigration and Colonisation, Ottawa.

FIG. 71. GETTING ON IN ALBERTA

Nick Charuk, a Russian living north of Vegreville, has done so well that he now lives in a real house. How were the walls of the old house constructed? Describe the roof. What evidences are there that he is a careful farmer?

By courtesy of Mr. C. A. Matthews.

FIG. 72. THE FIRST HOME OF A RUSSIAN PEASANT IN ALBERTA

How large is the house? Of what are the walls built? With what is the roof covered? Why are the poles hung over the roof? Of what is the chimney made? What is the nature of the country? Find the well, the ladder and a hen.

of the men walked out to see how we were growing. I listened as they talked, and soon I heard many things that interested me very much. Three of them had arrived in Grande Prairie only a few days before. They were thinking of buying Peace River farms, but before doing so they wished to get as much information as possible. Mr. Rowe and Axel Hansen answered all their questions as well as they could, and in return asked many of their own.

William Ross, the oldest-looking of the three, was thin and wiry. He said he had come from Prince George by the *Summit Lake* route (Figs. 65 and 74—also Map 23, Atlas).

"I have often wished to make that trip," said Mr. Rowe; "how far is it?"

"About three hundred miles to *Hudson's Hope*," was the answer, "and about fifty more to *Fort St. John*, where I left my boat. From there I walked most of the way to Grande Prairie."

"Can you take your boat all the way?"

"Very nearly; it is thirty-two miles by road from Prince George to Summit Lake, but from there you can travel by water down Crooked River, McLeod Lake, Pack River, and Parsnip River to Finlay Forks, where the Finlay and the Parsnip join to form Peace River. Seventy miles further down you come to Rocky Mountain Canyon, and there, of course, you have to go over the *portage*. It is fourteen miles, and just at the end of it is Hudson's Hope. It is not a hard trip, but it is a lonesome one for a man who travels alone as I did."

"Are you going to grow wheat here?" asked Axel.

"I am not. The only kind of farming that interests me is stock-raising. That is why I am here. For years I have had a ranch south-east of Medicine Hat, but there isn't much range left there now, and the rainfall is so light that one can't grow enough feed to carry stock through the winter. What do you think of the prospects here?"

It was Mr. Rowe who answered: "The sooner people come to realize that this is a mixed-farming country, and not just a grain country, the better it will be. We can raise oats and barley that are just as good as our wheat, and a farmer who has these, and cattle and hogs as well, is in good shape to meet almost any kind of weather as well as any kind of marketing conditions."

A new voice joined in the conversation. "Down where I come from we found that out long ago."

"Where do you come from?" asked Axel.

"Near Brandon, in Manitoba, and my name, by the way, is John

Thomas. We used to grow nothing but wheat, but now we know that we must raise other things as well. Dairy products and eggs are important with us too."

"*Brandon*," interrupted Mr. Ross. "Is that on the *first prairie level* or the second?"

"I don't know what you mean," answered Mr. Thomas. "The prairies are about the same level everywhere, are they not?"

"Of course they are not," was the answer. "There are three distinct levels, and they all run north-west and south-east. The first one takes in most of Manitoba; the second one has Manitoba's south-west corner and all of Saskatchewan except its south-west corner; the third one runs right to the foothills of the Rocky Mountains (Fig. 68). What is Brandon's altitude?"

"Twelve hundred and four feet."

"Twelve hundred and four, eh! And Winnipeg's is seven hundred and seventy-two. Brandon is on the second level, then. Medicine Hat, where I used to live, is half-way across the third; its altitude is twenty-one hundred and eighty-one feet. Most people think, as you do, that our prairies are as flat as a table, whereas the Canadian Pacific railroad trains have to climb almost twenty-seven hundred feet in travelling from Winnipeg to Calgary."

"Do the railroads follow the rivers as they do in British Columbia?" inquired Axel.

"Not as a rule, for it is usually as easy to build a railroad straight across country as in any other way. Actually the Saskatchewan–Nelson, which is really the only river system in the southern half of the prairie provinces, has no railroad near it for most of its course."

"I thought most of our cities were on the Saskatchewan," said Axel.

"Many of them are," rejoined Mr. Ross, "or on a branch of it. Edmonton and Prince Albert are on the North Saskatchewan; Saskatoon and Medicine Hat are on the South Saskatchewan, while Calgary is on the Bow. Then Brandon is built on the Assiniboine, while Winnipeg is at the junction of that river and the Red River. Of course, the Red River flows into Lake Winnipeg, but its water unites with that of the Saskatchewan to flow down the Nelson River into Hudson Bay. Most of these cities existed before the railroads were built; the railroads came to *them*, and not to the rivers."

"Is the coal strike settled yet?" asked Mr. Rowe.

"What coal strike?" replied Mr. Ross.

FIG. 73. Natural divisions of the Prairie Provinces. The three levels are tinted differently; the escarpments between the levels are indicated.

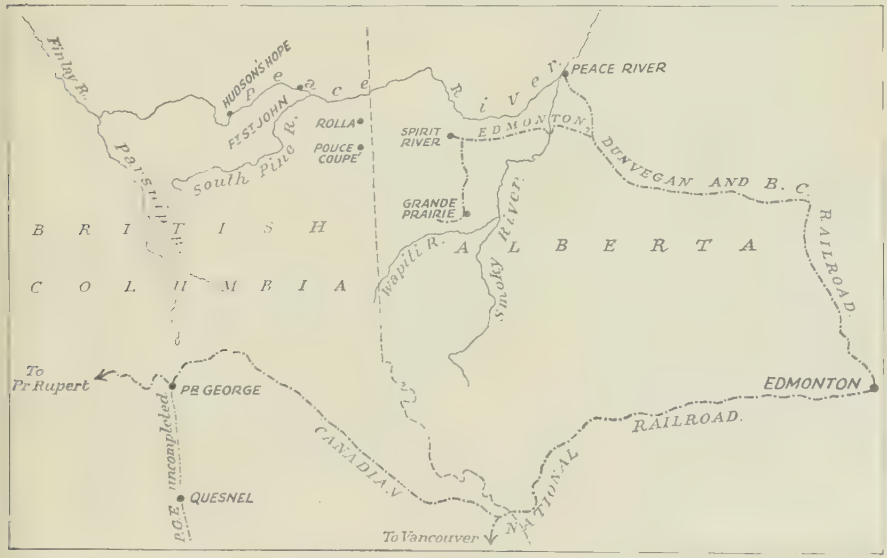


FIG. 74. This is a map of the Peace River district. Locate on it the places mentioned in "My Diary." British Columbia newspapers often have articles about proposed railroads from the coast to Peace River. Read some of these articles and trace the suggested routes on the map.

By courtesy of Department of Immigration and Colonisation, Ottawa.

FIG. 75. NUMBER ONE, MANITOBA HARD

How high is the grain? What grain is it? Notice the fine buildings.

By courtesy of Department of Immigration and Colonisation, Ottawa.

FIG. 76. A SQUARE MILE OF GOLD

What grain is shown in the foreground? What is the character of the surface? How far does the shocked grain extend? Why is the grain left standing in shocks?

"Why, in the Southern Alberta mines," was the reply. "It seems a shame that larger markets cannot be found for that coal. It is true that Alberta produces more coal than any other province except Nova Scotia, but when our coal resources are far greater than all of the rest of Canada together, we should be able to make more use of them."

Just then a call, "Supper's ready," came from the house and, much to my regret, I heard no more.

June 21st. What a wonderful day! I really believe I grew a whole half-inch. Last night it rained for four hours. This morning it was clear, bright, and really hot; and, best of all, the sun shone for *seventeen hours*. Think of it! From four o'clock in the morning till after nine at night! All that time to grow! Spring may be late up here in the Peace River, and we may have fewer *days* to grow than they have farther south, but we certainly make up for that when we have more growing *hours*.

And another thing! I know now what Axel Hansen meant when he said that fifteen inches of rain was enough if it came at "the right time." The right time is in May, and June, and July, for that is when I am growing and when I need all the moisture and all the sunshine that I can get. Rain in August or September would keep me from ripening and from being threshed, so I could not be more fortunate than I am here.

August 28th. It has been very dry and hot for the last two weeks. My head is getting so heavy that I can hardly hold it up. I am no longer a bright, pretty, green colour, but yellow, almost like gold.

We all feel that something is going to happen soon. This morning Mr. Rowe walked through our field, and we heard him say, "We must start in two or three days."

September 4th. It has come. Our quiet, happy life in the field is over. Yesterday morning, just after daylight, we heard a great noise near the fence; men were talking, horses were stamping, and soon there was a steady "Whir, whir, whir," along with the sound of wheels on the dry ground. All day long it kept up, and very slowly seemed to be getting nearer to us, but when night came it was still too far away for us to see what it was. This morning it began again, and at noon it reached me. A huge machine —Mr. Rowe called it a "*binder*"—passed close to me, and the next thing I knew I had been cut off near the ground, tossed up in the air, thrown down flat on the machine and, with hundreds of others, tied tightly with a piece of twine. Then we were dropped to the ground, and were left lying there until a man picked us up and placed us with several other *sheaves* to make what he called a *stook*. So here we are, waiting in the field, for what is to come next (Figs. 69 and 76).

October 1st. We are still here, and Mr. Rowe is worried about us. There have been two heavy rains lately, and they have made us damp and soft. Warm, dry weather will make us right again, but we may not get many such days at this time of the year. Mr. Rowe says he does wish the threshers would come soon.

October 9th. The threshers are here. The engine and the separator are in the field ready to start, and five of the neighbours have come with their teams and wagons to help (Fig. 70).

Now it is my turn. Our sheaf has just been pitched up on the top of a loaded wagon, and we are being hauled across to the thresher. What a wonderful machine it is! A man, called the feeder, throws the sheaves into it, and, at once, toothed wheels tear them into pieces and knock all the wheat out of the wheat-heads. Before we have time to think, our straw has gone one way, blown through a long pipe out on a stack, and our grain has gone a different way entirely until it runs out of a spout into a sack. Soon these sacks are loaded into wagons, to be hauled out to the *elevator* at Grande Prairie. The sack in which I found myself was one of the last to be filled, so, as it was almost dark, I was left in the wagon at the farm all night. That is how I came to hear the owner of the threshing-machine say to Mr. Rowe, "You have the best crop in the district; it will average forty-five bushels to the acre."

October 10th. I am in an elevator at Grande Prairie (Fig. 78). It is right beside the railroad tracks. Axel Hansen hauled us in from the farm with his team. On the road he met John Thomas, who had been at the picnic on May 24th. They began to talk, and soon John said, "Will this wheat go to Great Britain?"

"I expect some of it will," answered Axel.

"How does it go—through Fort William and Montreal?"

"Now you have asked a real question," was the reply, "for getting our produce to market is our biggest problem. First of all, it must go over the Edmonton, Dunvegan, and British Columbia railroad to Edmonton, about four hundred miles. From there it may go east to Fort William, over twelve hundred miles by rail, then down Lake Superior and Lake Huron by boat, and finally by rail again to Halifax or Montreal or any one of half-a-dozen Atlantic ports. However, it is more likely to go west by the Canadian National Railroad, either to Vancouver, a haul of eight hundred miles, or to Prince Rupert, which is about nine hundred and fifty miles. Whichever way it goes it costs a lot of money."

"Where does it go when it gets to the Pacific?"

"That depends. If it is going to Great Britain it will probably be

By courtesy of Mr. C. A. Matthews.

FIG. 77. THE PRINCE OF WALES'S RANCH IN ALBERTA
From which side is the sun shining in this photograph?

By courtesy of Department of Immigration and Colonisation, Ottawa.

FIG. 78. ELEVATORS LINE THE RAILWAYS EVERYWHERE ON THE PRAIRIES
How many elevators are there in this village? Why are they in a line? Why are they so high? Explain their use.

By courtesy of Leonard Frank.

FIG. 79. A TERMINAL ELEVATOR AT VANCOUVER

Of what material is it constructed? Why is it so high? Why are the sides formed in cylinders?

shipped in a vessel which goes down the coast and through the Panama Canal. But lately a lot of our grain has gone to Japan or China."

"Isn't there any shorter route?" asked John.

"Not now. Some day there will be a railroad built to *Churchill* on Hudson Bay, which will be a much shorter way. However, what we want most here is a railroad which will run directly to the Pacific coast without going to Edmonton at all. We'll get it, too, before many years are over."

Just then we drove up to the elevator, and I heard no more. Half-an-hour later Axel was on his way home, and I was stored away with thirty thousand bushels of wheat waiting for our next move.

November 14th. So this is Vancouver! It has been a long trip. We left Grande Prairie ten days ago in a big box car, tightly fastened up, and with the door sealed. After three days on the E.D. and B.C. railroad we reached Edmonton, where we rested quietly for two days. Then, early one morning, our car was placed with many others in a long train, and we started on our trip over the C.N.R. to Vancouver. Hour after hour we rolled along, so smoothly and so swiftly that we could scarcely believe that we were really crossing through the Rocky Mountains. We had heard that the C.N.R. had a better "grade" than any other railroad, and now that our journey is over we are sure that it is true.

This morning, very early, we crossed the Fraser River on a long bridge and came into New Westminster, whence we soon ran into the railroad yards in Vancouver. A few hours later found us out on a long wharf, beside which stood a large building. This, we learned, was a *terminal elevator* (Fig. 79). It was many times as large as the elevator at Grande Prairie; in fact, I heard the Superintendent say that it would hold more than two million bushels, or nearly seventy times as much as the Grande Prairie elevator. Our car stopped in front of it, and in a very few minutes the whole load of wheat had been moved to the top of the elevator. It was an interesting ride. I found myself in a small bucket fastened to the side of a chain; both above me and below me, as far as I could see, were similar buckets, all going up—up—up. Suddenly my bucket turned upside down, and I was thrown out, only to fall in a huge bin with millions of other grains.

We did not stay there long. We were moved about to be weighed, to be cleaned of chaff and dust, and to be dried; and at last we dropped on a wide rubber belt which carried us for hundreds of feet. Unexpectedly, we shot into a long pipe which sloped sharply downwards; a second or two in this, a flash of sunlight and blue sky, and we came to rest far below. Wheat was below me and wheat was on every side of me; soon I could neither see nor hear for many, many tons of wheat were above me.

Marine News. Vancouver, B.C., November 15th, 1927.

"The British freighter, *s.s. Benvoirlich*, sailed late this afternoon for the United Kingdom, with a full cargo of grain."

But my life and usefulness were not yet over. My companions and I arrived in Liverpool (England) on a wet and blustering day and our sacks were hustled into a huge warehouse at the dockside. I gathered, from men talking round about me, that my sackful and many others were bought by a large bakery firm, and that we should soon be made into beautiful loaves of brown, crisp bread or perhaps into dainty little rolls to nourish the boys and girls of England.

EXERCISES

1. Trace on a map the route followed by Mr. Ross from Prince George to Fort St. John. When Alexander Mackenzie went "from Canada by land" to the Pacific Ocean he did not travel on the Crooked or the Pack Rivers or on Macleod Lake. Find out, from Fig. 65, Chapter VI, how he did go.

2. A bushel of wheat weighs sixty pounds. How many pounds of flour and how many loaves of bread can be made with it?

3. Measure the distance from Saskatoon to Port Nelson as it is shown on Map 22 in your Atlas, making sure that you use the scale correctly. Then, from Map 2, find how far it is from Port Nelson to Liverpool. In the same way, find the distance from Saskatoon to Liverpool by way of Vancouver.

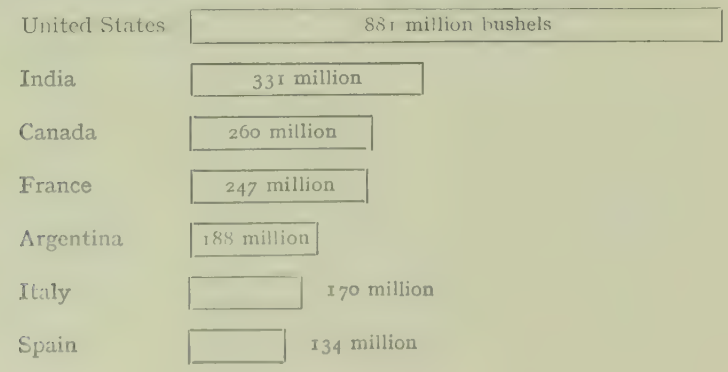
4. Canada and the United States are planning to make the St. Lawrence River and canals twenty-seven feet deep, so that large, ocean vessels may go all the way to Fort William. Will this make any difference to Vancouver? Why?

5. Why has it been easier to build railroads through the prairie provinces than through British Columbia?

6. A man wishes to farm. He has very little money, so he must "homestead" or "pre-empt" free, Government land. Should he go to British Columbia, or would he be more likely to be successful in Alberta or Saskatchewan? Arrange a class debate to bring out the unfavourable points as well as the favourable ones for each province.

The World's Wheat

The *average* production of the world (excluding Russia), for the years 1918 to 1922, was, according to the *Canada Year Book*, 2,996,000 bushels.



Why is Russia "excluded"? Find out (from the *Statesman's Year Book*) how much wheat Russia produced last year.

Make a diagram, like the one above, for some year since 1922.

Where does our Wheat go?

In 1924, seventy-eight per cent. of Canadian wheat was exported and twenty-two per cent. was used at home.

What countries buy our wheat?
What do we buy from those countries?
Through what ports is our wheat shipped?
What does "used in other ways" mean?
Your Geography text-book will not answer these questions, but a good Year-book will.

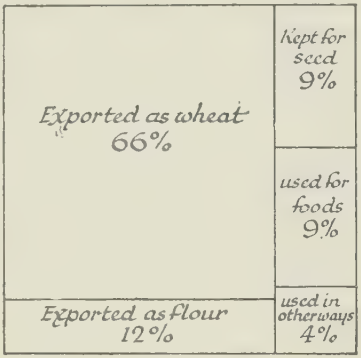


Fig. 80.

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

If the people of the world were extended in a line, every fourth person would belong to the British Empire, every fifth one would be a Chinaman, but two hundred would stand between every two Canadians.

Fort William and Brandon have the largest proportion of adults that can neither read nor write of any Canadian cities; London has the smallest proportion.

A larger proportion of the people of Ontario can read and write than in any other province, and a smaller proportion in New Brunswick.

The city of Quebec has the greatest percentage of its people born in Canada (97%), and Victoria, B.C., has the least (46%).

The death rate in Saskatchewan is lower than in any other province, indeed, it is lower than in any country in the world.

Quebec is the only province in Canada that contains more females than males.

The people live closer together in Prince Edward Island than in any other province and live farthest apart in British Columbia.

CHAPTER IX

THE GREAT LAKES AND THE ST. LAWRENCE

You have learned about British Columbia and the prairies. You have read about great forests, of wonderful salmon fisheries and mines, and of the wheat-fields on the plains. Let us now turn to Eastern Canada, and find out what our people are doing in the lands which face the Atlantic.

On Map 18 in your atlas you will find two old mountain systems. These are the Appalachians, which extend from Alabama to Gaspé, and the mountains of the Canadian Shield. Note the way the latter bend around Hudson Bay and James Bay. They are not high, rugged mountains like the Rockies, but are old, worn-down mountain ridges which the glaciers have ground and grooved into many domes and hollows. Some of these large hollows and old river valleys have been filled with water, and these we call the *Great Lakes*. Their combined waters flow out by the St. Lawrence River to the Atlantic, and provide the greatest system of inland waterways to be found in any continent. The provinces of Ontario and Quebec share this great waterway and the fertile low lands which border the waters.

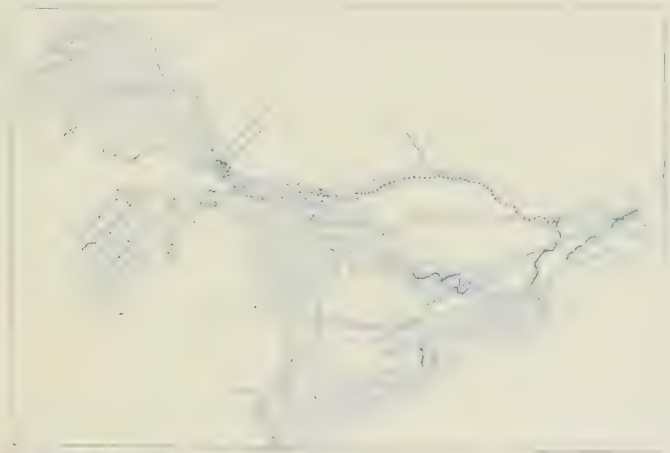
Ocean ships have always been able to ascend the St. Lawrence to Montreal Island and the junction of the Ottawa River. Beyond this point, and up to Lake Ontario, rapids interrupt the even flow of the St. Lawrence at several places, and canals have been built, so that now quite large ships can ascend the river in safety. The Lachine Rapids near Montreal are the best known. Crossing Lake Ontario, we find that Lake Erie is three hundred and sixty-two feet above us, and that the waters drop down by the Niagara River and the famous Falls in a roaring mass of spume and spray. The falls are one hundred and fifty-five feet high, and visitors come from far-distant lands to see them. Goat Island divides the falls into two parts, one known as the American Falls, the other as the Horseshoe or Canadian Falls. Below the falls the river rushes through a seven-mile gorge in a series of whirlpools and rapids, and finally enters Lake Ontario as a broad and peaceful stream.

The Welland Canal has been built to overcome the falls and has twenty-seven locks. But a new canal has been recently undertaken, which will have but eight locks, each eight hundred feet long with a drop of

By courtesy of Department of Immigration and Colonisation, Ottawa.

FIG. 81. THE THUNDER OF WATERS: NIAGARA'S CATARACT

From what position was this picture taken? Describe the shapes of the two falls. Which is the Canadian or Horseshoe Falls? What indicates that the water immediately below the American Falls is shallow? What is the dark object in the centre of the river just below the Canadian Falls? From the size of the river above the American and Canadian Falls, which appears to have the greater volume of water? Are there rapids above the falls? What rises from the foot of the falls? How wide is the river below the falls? What difference in the banks of the river is there below and above the falls?



AND CHIEF RIVERS

The parts of incomplete canals are represented by broken lines. The numbers after the names of the canals indicate the depth of water in feet.

FIG. 83. ECONOMIC MAP OF ONTARIO

Find three centres of mining and three of manufacturing.

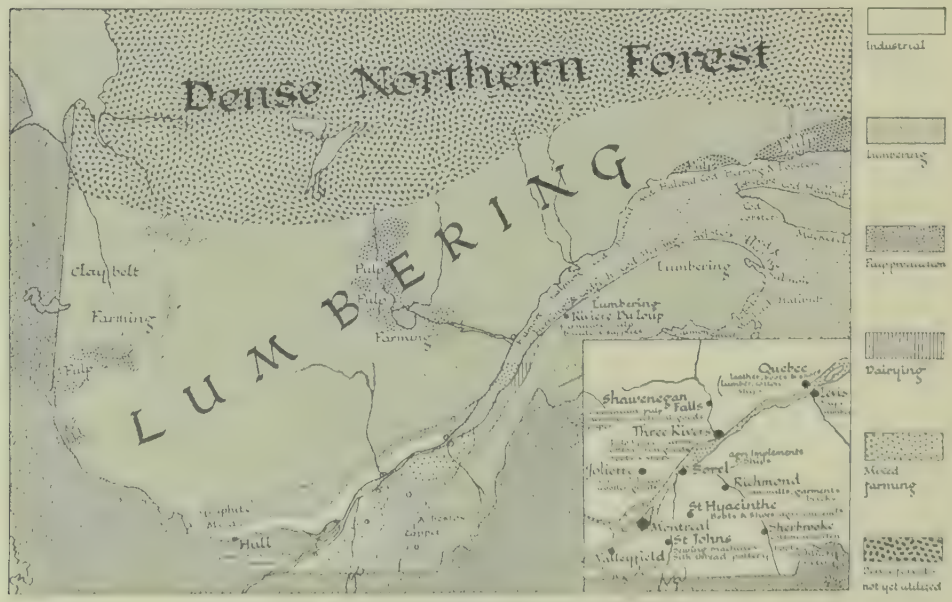


FIG. 84. ECONOMIC MAP OF QUEBEC

Notice the large area where lumbering goes on.

twenty-seven feet. This will permit the large vessels of the upper lakes to take their cargoes through to Kingston and Prescott.

From Lake Erie we may go by way of the Detroit River, Lake St. Claire and river to Lake Huron, and on to the "Soo" (Sault St. Marie). There the waters divide, a southern branch taking us to Lake Michigan, which is wholly in the United States. At Sault St. Marie there is a drop of nineteen feet from Lake Superior over a broad, boulder-strewn river-bed. The Soo Canal will take us safely into Lake Superior, the largest of the great lakes, and six hundred and two feet above sea-level. Large steamers will take us to the head of the lake, where the cities of Fort William and Port Arthur stand, with their grain elevators lining the shore.

By the aid of the canals we have come nearly half-way across the continent, and by the same means we can go from Fort William down to the sea. Not long ago a vessel left Toronto and sailed to Vancouver. What would be the shortest route and through what waters would the vessel pass? Through these waterways Canada exports a large part of her prairie grain. From the terminal elevators at Fort William trace the route of a ship-load of wheat to Montreal. What cities can you find on the Canadian shore of the lakes? on the American shore? Where is Chicago?

Grain elevators and ships. At Fort William and Port Arthur we shall see tall cement buildings covering acres of ground and standing close to the shore of the lake. On one side are long lines of railway cars loaded with grain from Winnipeg. On the waterside are long, low ships loading grain from the elevator. The huge building, with its many compartments, is a great storehouse for the grain. As fast as the trains bring the wheat from the prairies it is unloaded into the elevator, where it is cleaned and, if necessary, dried, for export.

The ships sail away down Lake Superior to the Soo, pass through the canal, and cross Lake Huron. The smaller vessels go down to Montreal, but the larger ships stop at Depot Harbour, Port McNicoll, or Goderich, where the grain is transferred to railway cars. Other vessels go to Buffalo and Port Colborne and unload their grain into elevators. Thence the wheat is carried either by barge down the Barge Canal to New York or by steamer to Montreal. When the new Welland Canal is completed we hope that more of our wheat will go down to Kingston, on Lake Ontario, and so by an all-Canadian route to Britain and European markets.

Montreal (pop. 800,000) is the largest city in Canada. It is at the head of deep-water navigation on the St. Lawrence. There large ocean vessels may tie up to the elevators and receive their cargoes of golden grain. It is at the junction of the Ottawa with the St. Lawrence, and much of the trade

from the Ottawa valley centres at Montreal. There is direct rail connection eastwards to St. John and Boston. It is a financial centre where many large companies have their headquarters. There are rows of warehouses which receive the goods which the Canadian people buy from overseas, while other warehouses collect Canadian-made goods for export. Montreal is thus Canada's great eastern import and export centre. Halifax and St. John perform a similar service for the people of the maritime provinces, while Vancouver is a growing rival on the Pacific. It is often advisable to build factories for the manufacture of raw materials close to the place where the ships bring in their cargoes, so we find that many people have selected Montreal for this purpose. Altogether there are fourteen hundred factories in and near the city. Among these we may note flour mills and sugar refineries, silk mills and cotton mills. There are factories where boots and shoes are made, where crude rubber is turned into tires and footwear; tobacco factories, iron foundries, cement works, and still other factories where many other articles are made.

Montreal suffers from one serious handicap. On Map 14 note the January isotherm, which passes through the lower St. Lawrence valley. The river freezes and navigation is closed from November to March. If the people of Montreal could keep the St. Lawrence open the year round, their city would soon have a population of over a million inhabitants. Vancouver, on Burrard Inlet, is more fortunate in its location. It has an ice-free port, and may in time rival Montreal.

A land of forests. When Champlain came up the St. Lawrence and explored the Ottawa he found a great forest, which clothed the valley lands and mounted the rolling hills as far as the eye could see. Mixed in with the spruce and pine were tall hardwood trees, the birch, beech, oak, maple, and ash. For three hundred years men have been hacking away at this great forest. The fertile lowlands have been cleared, and now fine farms stretch back to the distant hills. Thousands of shiploads of lumber have gone down the St. Lawrence from Quebec, Three Rivers, and Montreal to markets in the United Kingdom, Europe, and the United States. These forests still yield a large amount of lumber, but a new industry has grown up, whose value is far greater than that of the sawn lumber. It is an industry which employs thousands of men, which builds great dams and power plants, and houses itself in huge factories which grind the logs to the finest pulp—the making of pulp and paper.

From logs to paper. When you turn over the pages of a daily newspaper, do you realize that some six months before that very paper may have been part of a tree growing in the forest? Yet it is so. The world is full of

By courtesy of Canadian Air Board, Ottawa.

FIG. 85. PART OF OTTAWA

The building with the high tower is a part of the Parliament Buildings. Government Office Buildings stand on each side of the lawn in front of the Parliament Buildings. What river runs behind the Parliament Buildings? If a man crossed the bridge shown in the picture, what city would he be in?

By courtesy of F. C. C. Lynch, Director Natural Resources Intelligence Branch, Department of Interior, Ottawa.

FIG. 86. THE HUB OF CANADA

A part of the harbour of Montreal. How are the docks arranged? How many ships are in the dock in the foreground? What is the use of the elevators? Are there railway tracks along the wharves?

By courtesy of F. C. C. Lynch, Director Natural Resources Intelligence Branch, Department of Interior, Ottawa.

FIG. 87. TOOK TWO HUNDRED YEARS TO GROW, ONE HOUR TO FELL

Winter scene in Northern Ontario. On which side are they using the cross-cut saw? What has just been done on the opposite side? How deep is the snow? Compare the stand of timber with that in British Columbia as illustrated in Fig. 30.

many such wonderful changes. In Canada we actually grind up our forests and turn them into newspapers, magazines, and books. Canada is to-day the greatest manufacturer of newsprint in the world. Canadian pulp and paper mills surpass all others in their output.

The centre of this industry is in the valleys which drain into the St. Lawrence River basin. Figs. 83 and 84 will show you where the mills are located. Men found that the dense spruce forests of the Canadian Shield mountains were well adapted for the making of paper. The trees are cut down, the branches are trimmed away, and the bark is peeled off. The logs are then floated down the rivers to the mills. There they are cut into two-foot lengths. Some mills press these spruce billets against large revolving rough stone discs, and gradually wear the wood to a fine pulp. Other mills prefer to thrust the log against revolving knives, which cut it into little chips. These are soaked in a hot chemical solution until the wood fibres are loosened. When this wood *pulp* is pressed or rolled into thin flat layers and dried, it becomes paper. Huge rolls of paper are sent from the mill to the newspaper offices and to the book-binderies. When we consider what a great part of the world's knowledge is spread by books, magazines, and newspapers, the part Canada plays in educating the world can be readily seen.

British Columbia, Nova Scotia, and New Brunswick have large pulp and paper mills. The value of their combined product amounts to about fifteen million dollars annually, but this is small in comparison with the huge output from the mills in Ontario and Quebec. There are one hundred and fourteen mills of this kind in Canada; forty-five produce pulp only, thirty-five are combined pulp and paper mills, whilst thirty-four mills produce paper only. The total value of the pulp and paper produced in all Canada amounts to over three hundred million dollars.

One hundred of these mills are in Ontario and Quebec. There the finest spruce forests in North America are found, as well as hundreds of waterfalls, where electrical energy may be developed. Thousands of lakes were left by the old-time glaciers, and, with the winter snows, they provide full-flowing streams. These dash down over the rocky ledges of the mountain upland into the low-lying St. Lawrence. Many falls and rapids are thereby caused, and a large amount of electrical power is easily generated. Pulp mills need plenty of cheap power; hence the mills in the Laurentian region are said to have a strategic location. The forests produce the pulpwood, the rivers carry the logs to the mills, and the falling water furnishes the power to grind the wood into pulp. Nowhere else in the world are all these factors found on so large a scale and over so wide an area.

Here are the names of a few of the great mill towns. Can you find them on the maps in your atlas?

Port Arthur, Sault Ste. Marie, Ottawa, Thorold, Iroquois Falls, Smooth Rock Falls, Sturgeon Falls, Espanola, Fort Francis, Dryden and Kapuskasing, Hull, Three Rivers, Shawinigan Falls, and Quebec.

Ottawa. The capital of the Dominion. When the Dominion was formed in 1867 Toronto, Kingston, Montreal, and Quebec each wished to be the capital. As it was impossible to choose one without offending the others, Queen Victoria selected Bytown, on the Ottawa. There the beautiful Parliament buildings were erected on the high cliffs overlooking the river and the Chaudière Falls. Ottawa is essentially a residential city, with beautiful homes, wide lawns, and avenues shaded by maple trees. Nine railways enter the city, and the Rideau Canal leads southward to Lake Ontario. The power generated at the falls has led to manufacturing, and to-day there are factories which make paper, cardboard, tents, awnings, and cement. There are large lumber mills. Across the river is Hull, which has long been noted for its lumber mills and match factory.

The hardwoods are also found in the valley of the St. Lawrence. The most valuable of all these trees to the Indians was the birch. From its bark they made canoes, and with it they covered their wigwams and "long-houses." The white man found other uses, and to-day this strong, tough wood is used in making farm machinery, automobiles, wagons, sleighs, and furniture. The beech, maple, oak, basswood, elm, and ash are also used in making these articles. The sugar-maple groves produce maple sugar and maple syrup. This is an important industry in Quebec. The ash is valuable for axe-handles, for the handles of shovels, rakes, hoes, and many other tools. And so we find large factories in Ontario and Quebec, where implements, tools, and wagons are made.

The factories have been built close to the source of the raw material. The workmen turn out a large amount of finished material each day, because of pleasant and healthful surroundings. The climate is cold and stimulating in winter, and the heat of summer is moderated by cool breezes from the great lakes. Electrical energy is cheap and plentiful. Niagara Falls alone produces over five hundred thousand horse power, which is distributed as far east as *Kingston* and as far west as *Windsor*. Coal is brought in by rail from the mines in Ohio and Pennsylvania, and by sea from Sydney, Cape Breton Island, to Montreal. The manufacturing cities of southern Ontario are on or near the great lakes, and may ship their products to the prairies by water and rail. In fact, the factories of Ontario and Quebec distribute their products throughout British Columbia, and even to Australia and New Zealand.

FIG. 88. LARGE PUNCH PRESS.
The bottoms of steel grain boxes for drills being punched.

By courtesy of T. Eaton Co., Ltd.

FIG. 89. THE LARGEST STORE IN THE BRITISH EMPIRE

The Toronto stores and factories of a large firm, manufacturing garments for men, women, and children, thread, luggage, harness, school books, drugs, toilet preparations, and candies for sale in the retail stores.

We may say that the people who live in the cities from Owen Sound to Quebec are busy making things, manufacturing, for the rest of Canada. If you can arrange a visit to a hardware store, a furniture store, and a sporting goods store, you can soon make a list of the main articles which they carry and a list of the factory cities from which they have come.

The lowlands of the St. Lawrence extend from Lake Huron to Ottawa and down to Quebec. They are bordered on the south by the Notre Dame Mountains (Map 19, Atlas). Within this area twenty million acres have been cleared, and the farmlands stretch back from the river and the low-lying lake shores to the distant hills. The people of eastern Canada are fortunate in having these fertile lands near their great water highway. When thousands of men are busy making things such as pulp, paper, furniture, and machinery, other people must supply them with food. The numerous factory towns are surrounded with farms and truck gardens. Not only does the farmer find a ready market, but the factory worker can buy food at low prices.

Dairying is the principal industry on the farms of this lowland region. Great quantities of hay, roots, and oats are grown to feed the cattle, whilst the pastures provide rich summer feed. Milk, cream, butter, and cheese are produced. The skim milk is fed to the hogs, and bacon and hams are cured in large quantities. Every village of any size has its creamery or its cheese factory. More is produced than the people can eat, and millions of dollars worth are exported each year to the United States and Great Britain.

The Niagara Peninsula is particularly well adapted for fruit-growing. The climate is mild, and winds from the cool waters of the lakes prevent the buds opening too early in spring. This is one area in Canada where peaches and grapes are grown in large quantities. Apples, pears, plums, and small fruits are so plentiful that it is hard to find a market for them. There are seventy canning factories, which help to preserve some of the crop for winter use.

In addition to all this farm wealth, there are fish in the lakes, trout in the streams, game in the forests, and maple sugar from the sugar-maple groves. The lowlands of the St. Lawrence are fair and fertile lands. On their broad surface the factory towns hum with the whirring of machines, while to east, north, and west, the pulp mills ceaselessly grind the spruce billets from the forests of the Canadian Shield. The lakes and tumbling streams provide millions of horse-power with which to run the mills and the factories in the towns. There is coal near by. The winters are bracing, the summers are mild, and the rainfall is evenly distributed throughout the year. Could we not call the St. Lawrence lowlands Canada's hive of industry?

1. Here is a list of some of the products manufactured in Ontario and Quebec. Make a drawing of the St. Lawrence basin from Lake Superior to Quebec city and place in dots to represent the cities named.

Agricultural implements: Toronto, Hamilton, London, Goderich, St. Catherine's, Waterloo, Stratford. Plough works: Brantford. Pianos and Organs: Guelph. Wagons: Woodstock. Carpets and worsted mills: Guelph. Engines, boilers; mining, woodworking, and machine tools: Toronto, Hamilton, Dundas, Galt, and Kitchener. Electrical works: Peterborough and Hamilton. Locomotives: Kingston. Railway cars: Ottawa, Hamilton, and Preston. Furniture for churches, schools, offices and homes: Toronto and Hamilton. Motors: Oshawa, Windsor, Ford. Rubber goods, boots, tires, hose, belting: Toronto. Cotton mills: Hamilton and Kingston. Shirts and collars: Kitchener. Knitting mills: Galt. Sewing-machines, and linen thread: Guelph. Flour mills: Goderich. Cotton, woollen, and flour mills: Montreal, Valleyfield, and Sherbrooke. Silk: Montreal and St. John's. Boots and shoes: Montreal, St. Hyacinthe, Sherbrooke, and Quebec. Lumber: Quebec, Levis, Three Rivers, and Shawinigan Falls. Matches: Hull.

2. Ontario produces one-third of the total output of the dairy farms of Canada. The pork, bacon and hams from five Toronto packing plants were worth 60,000,000 dollars in a recent year.

Here are a number of comparisons.

	Population.	Acres.	Butter and Cheese factories	Butter (lbs.).	Value ($).	Cheese (lbs.).	Value ($).
Ontario	3,030,000	14,000,000	1,030	60,000,000	22,060,000	119,280,000	24,600,000
Quebec	2,673,990	6,900,000	1,600	49,400,000	18,900,000	51,700,000	10,700,000

Why should Ontario produce more than Quebec? Make a graph showing the relative production from each province. Use dots, ◍, each dot representing one hundred thousand.

3. Traffic on the Great Lakes closes about December 15th. Consult Map 14 in your Atlas. What do the temperature lines tell you? When the season for navigation opens about the end of March, in what condition will you find the grain elevators at Fort William and Port Arthur? The total storage capacity at these two ports is about seventy million bushels, the largest in the world. What effect will the building of the Hudson Bay Railway have upon the grain trade down the lakes? What other competitor has the Great Lake grain route?

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

Manufacturing leads in the value of its production among all the industries of Canada, and farming stands second.

Over half a million Canadians are engaged in her factories.

The water-powers of Quebec surpass those of any other province.

If all the railways of the world were stretched in straight lines side by side, the Canadian National would stretch a long way farther than any other.

The leading manufacturing process in Canada is the making of pulp and paper.

The goods passing through the Soo Canal in the Great Lakes weigh three times as much as those passing through the Suez Canal, but the value of the goods passing through the latter is very much greater than through the former.

The busiest trade route in the world is the one in the North Atlantic between New York and Liverpool.

By courtesy of Publicity Bureau, Toronto.

FIG. 90. TORONTO'S SKYSCRAPERS
Count the number of stories in the high buildings.

By courtesy of Canada Air Board, Ottawa.

FIG. 91. THE HUB OF THE PRAIRIES: WINNIPEG

The magnificent Parliament Buildings are conspicuous. What is the name of the river?

CHAPTER X

WHICH IS GOING TO BE LARGER, TORONTO OR WINNIPEG?

Why have Toronto and Winnipeg become great cities? On what expanse of water is Toronto? (Map 20 in Atlas.) Name six large American cities on the Great Lakes that can be reached by boat from Toronto. How many railway lines enter Toronto? What railway lines run from Toronto to Sudbury? and to North Bay? If goods were being shipped by railway from Western Ontario to Western Canada, would they pass through Toronto?

In what direction do the railways from Alberta and Saskatchewan turn as they enter Manitoba? (Map 22 in Atlas.) Why? Why are the railways running east and west not deflected to the south of Winnipeg? On what two rivers is Winnipeg? How many railway lines enter the city?

A DEBATE BETWEEN TWO TORONTO BOYS (D'ARCY BOULTON AND BEVERLEY ROBINSON) AND TWO WINNIPEG BOYS (JAMES ASHDOWN AND DONALD SMITH)

D'Arcy Boulton's Speech

Miss Teacher and fellow-pupils. Toronto has had a long start in the race with Winnipeg. To-day, with her five hundred and forty thousand people, she is almost three times as large as the prairie city (Fig. 91). Thirty years ago she was almost as populous as Winnipeg is to-day. During the last ten years the increase in population of Toronto has been almost three times that of the western city, and its rate of increase has also been greater.

The growth of cities may be compared to that of snowballs rolling down-hill. From their sheer size the large balls as they rush down press more snow into them than do the smaller ones. In the same way the big city by its sheer size attracts more people than does the smaller one. Hence, according to the law of growth, Toronto should outdistance Winnipeg more and more.

Toronto's shipping. What are some of the attractions that have drawn people to this great city? First of all its well-protected harbour gives access to Ontario, one of the Great Lakes, the greatest inland waterway in the world. By means of these huge expanses of water, and the majestic St. Lawrence River, Toronto has an unrivalled water-route that gives access to every ocean. These waterways bring the great cities of Chicago, Detroit,

Cleveland, and Buffalo to her very doors for trade. It is certain that soon the canals on the St. Lawrence River will be so deepened and improved that ocean steamers will navigate the Great Lakes. Then the giants of the ocean will steam into Toronto's spacious harbour to load automobiles for Australia and New Zealand, agricultural implements for Russia, Egypt, and India, cotton cloth for West and South Africa, and bacon, cheese, and butter for England and Germany. Many of the products of Ontario which at present are shipped from Montreal will then be loaded at this new ocean port. These changes will cause a rapid growth in population.

Toronto's feeders. Toronto is well situated for the collection of products from Western Ontario and the distribution of manufactured goods there. A spider's web of railways, with Toronto at its centre (Fig. 92), covers this part of the province, and this is the most densely populated and richest agricultural and manufacturing region in Canada; it is no wonder that Toronto is a great commercial city. Hundreds of trains, laden with cattle, horses, sheep, swine, poultry, butter, eggs, furniture, stoves, automobiles, and thousands of other articles, steam into her yards every day. These products are partly used by her own people, but are chiefly shipped to other parts of Canada and abroad.

Toronto and Niagara Falls. Much of the majestic stream of water that formerly flowed over Niagara Falls has been harnessed to make electricity. Great cables, which radiate like spokes of a wheel, conduct this power to the towns and villages of Western Ontario. No longer is the tall smoking chimney seen and the pounding steam-engine heard. Electricity from Niagara turns the wheels of the factory more cheaply, quietly, and dependably. The magic touch of this cheap power is causing factories to spring up all over the land, like mushrooms after rain. These new industries produce a corresponding growth in Toronto, the commercial centre of the region.

I have thus shown how well Toronto is situated to become a great commercial city.

James Ashdown's Speech

Winnipeg still a thriving baby. *Miss Teacher, boys, and girls.* When the country served by Winnipeg was still the undisputed home of the buffalo and Red Indian, Toronto was larger than any city now situated between Winnipeg and Vancouver. This great western city is an infant of only fifty years of age, but she is already larger than was Toronto when it had passed its hundredth birthday. Thus Winnipeg's growth has been more than twice as rapid as that of Toronto in its early years.

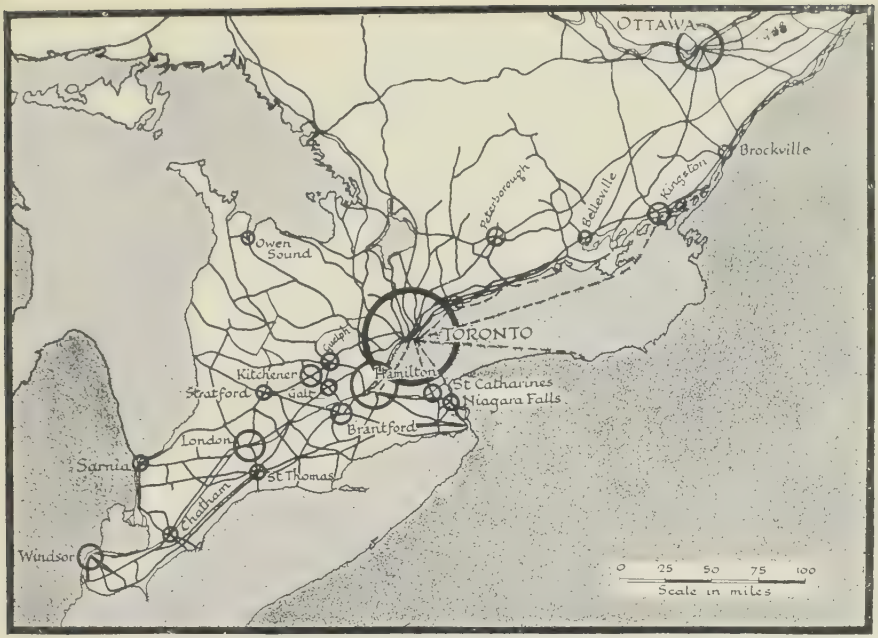


FIG. 92. THE SPIDER'S WEB OF RAILWAYS AROUND TORONTO

The circles represent the cities of over ten thousand people. The relative sizes are according to population.

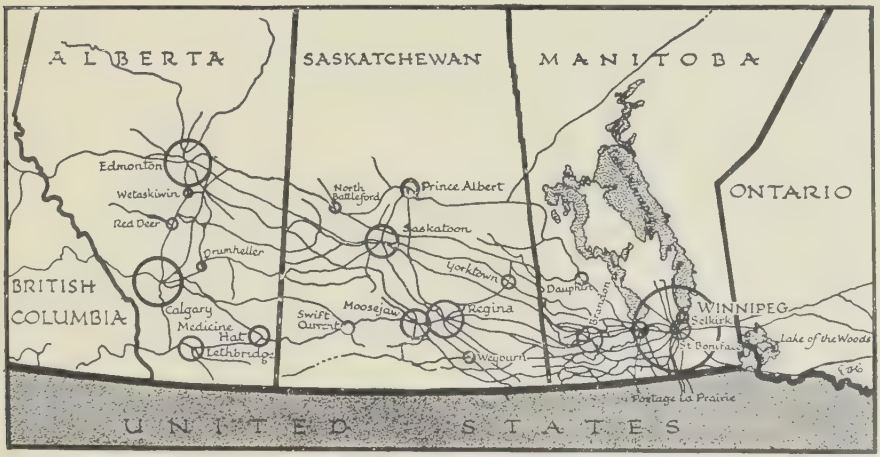


FIG. 93. THE RAILWAY FEEDERS OF WINNIPEG

The circles represent the cities and larger towns, and the sizes are according to population. Why do the railways in the northern section running east and west turn south in Manitoba?

By courtesy of Massey-Harris Company, Toronto.

FIG. 94. THE HUNTER'S RETURN

What season of the year is it? The forests are useful for timber and attract thousands of hunters every autumn.

Winnipeg in the neck of the bottle. A glance at a map of Canada shows that Winnipeg is the Canadian Chicago. Lake Winnipeg bars the way across Canada from east to west, except for a narrow passage to the south. That passage is made still narrower by the Lake of the Woods bulging north of the Canadian border. All routes from the prairies to Eastern Canada are forced through this narrow neck (Fig. 93), and Winnipeg stands at its centre. No other city in Canada, perhaps no other in the world, has such a unique position.

Three great transcontinental railways run across our country, and every one of them passes through Winnipeg alone among the great cities of Canada. Vancouver, Edmonton, Saskatoon, Fort William, Ottawa, and Montreal have two transcontinental railway lines; Calgary, Regina, Quebec, St. John, and Halifax have one; but Toronto has not one within a hundred and fifty miles of its borders.

Every bushel of wheat, oats, and linseed, every head of stock from the Prairie Provinces shipped east by Canadian routes, passes through the great railway yards of Winnipeg. The vast area of this fertile belt, whose products flow into Winnipeg for further shipment, is sure to contribute to its rapid growth. Since Winnipeg's hinterland, as the Prairie Provinces are called, is more than twenty times as large as Western Ontario, the hinterland of Toronto, it is easy to understand what magic strides Winnipeg is bound to make as the prairies fill up with prosperous farmers. At present it is safe to say that not one-seventh of the prairie land fit for cultivation is under crop, and as more and more of this land is brought under the plough, the increased production will be reflected in the increasing population of Winnipeg.

When we turn to Western Ontario the situation is very gloomy. Not only is there little hope of increasing the amount of farm-land, but year by year the rural population is actually becoming less and the agricultural produce is decreasing. This shrinkage is bound to react on the growth of Toronto.

The railway supersedes the river. It is true that Winnipeg has no such fine waterway as the Great Lakes. Nevertheless the Red River is navigable, and Lake Winnipeg gives access by boat to the northern part of the province. But railways are more and more replacing internal waterways. At one time boats used to run on the Saskatchewan as far as Edmonton, but since the Canadian Pacific Railway was completed the steamboat has vanished from the river. Just as certainly as new railways are built in Ontario, Toronto's importance as a port will dwindle. Moreover, when ocean steamers are able to pass into the Great Lakes, it is quite possible

that many of the goods now brought to Toronto for shipment by water will then be loaded on to boats at Sarnia, Goderich, Owen Sound, and other Lake Huron and Erie ports, to the injury of Ontario's chief city. Still worse, the head of navigation may then be transferred from Montreal to Port Arthur and Fort William, from which may be exported the western products that now are shipped from these lower-lake ports.

Beverley Robinson's Speech

Madam Chairman and fellow-pupils. Before giving further reasons why Toronto should rapidly become one of the greatest cities on the continent, I wish to point out the weakness of some of the arguments of my worthy opponent.

Wheat shipped west to go east. A few years ago it was true that the golden grain of the prairies passed largely through the Winnipeg bottle-neck, so vividly described by the opposition leader. But the completion of the Panama Canal has turned commerce into many new channels. One of the most interesting to Canada is the new route for the wheat of Alberta. The two lines of our own Canadian National Railways, which follow the Yellowhead Pass, have gradients so low that wheat can be carried to Vancouver much more cheaply than to the Atlantic Coast. Already, with feverish haste, gigantic elevators are rising along Vancouver Harbour, but these are not built fast enough to receive the wheat that is being rushed through the mountains every month. These great buildings are evidence that the glory of Winnipeg is departing, and that more and more of the western wheat will reach the Pacific through Vancouver, and not the Atlantic through Winnipeg.

Another cloud is appearing in the Winnipeg sky. A railway from the prairies to Port Nelson on Hudson Bay is nearing completion, and this will give the shortest grain route from the prairies to Europe. While it is still uncertain how far this line may be valuable for shipping, Winnipeg alone among the cities of the west will feel the full force of its rivalry.

Electricity the life-blood of Toronto industry. We have not yet described all the vigorous tap-roots that contribute to Toronto's sturdy growth. A dozen great cables, supported by high towers, stretch from Niagara Falls to Toronto. These act as giant arteries through which flows unceasingly the life-blood of industry—electricity. It turns the great machines which weave cloth and carpets, make wood and metal instruments, construct great automobiles, knit and make clothing of all kinds, and bring to perfection a thousand other articles. Toronto maintains a

dense population of well-to-do people ready to buy manufactured goods, and since its electrical power is very cheap, it is no wonder that Toronto pays more to factory hands in wages than any other city in Canada. But as yet she only feels the first pulse of this great wave of cheap electricity.

A political and educational centre. Toronto is the capital of Ontario, the richest and most populous of the Canadian provinces. Many officials are required to control affairs. This city is also the chief educational centre of Canada, and attracts thousands of students to its various schools and colleges, among which is the University of Toronto, the largest in the British Empire.

Thus we see that commerce vies with manufacture, and education with government, in contributing to the growth of this fair city.

Donald Smith's Speech

Winnipeg the centre of manufacturing for the prairies. *Miss Teacher, boys, and girls.* It has been truly said that farming is the most important of all industries, and that all others depend on it. Although the prairie has just begun to yield its harvests, a great city has already sprung to life where the Assiniboine pours its muddy waters into those of the Red River. Manufacturing follows farming. In Ontario electrical power is widely distributed. Hamilton, St. Catharine's, Kitchener, Peterborough, Ottawa, and other cities have electrical power near at hand, as Toronto has, and these cities are bound to take their share of manufacturing industry. In the Prairie Provinces it is different. On the flat plain there are few rapids and waterfalls to produce electricity. A few miles east of Winnipeg, however, the level fertile land is replaced by the rough, rocky Canadian Shield, whose rivers foam with rapids and roar with cataracts. These sources of power are close to Winnipeg but distant from other prairie cities. Already this young city has a thousand industries. Winnipeg will manufacture for the whole prairies, as she is almost the exclusive possessor of abundant power among cities of the west. In the not very distant future, while Toronto is sharing with dozens of other Ontario cities the manufacture of goods for farming communities of Southern Ontario, Winnipeg will throb with vibrating machines of factories supplying the varied needs of millions of prosperous farmers living on the vast Canadian prairies.

PUZZLE QUESTIONS ON CANADIAN CITIES

1. What city, on an island, is one of the prettiest in Canada? has few industries, but is ideal to live in? It is an ocean port and is named after our most beloved queen.

2. There is another city named after a queen, situated on an island, and the capital of a province. Although this city has only a population of twelve thousand it is by far

the largest city in the province. This city's name might lead one to think that it was only a town. Can you spell its name?

3. A very old city with an Indian name is situated on a very wide river. It has seen more battles than any other Canadian city and its great beauty attracts many tourists. A military wall and fortress make it the Gibraltar of Canada. It has over thirty boot factories. You should name this city easily, but be sure you pronounce it correctly.

4. This is also a very old city. It has a magnificent harbour, which is strongly fortified, and which has been visited by more warships than any other Canadian harbour. It ships more goods in winter than in summer, and exports more fish than any other Canadian port. It is named after a British earl, and there is a city in England of the same name. Sometimes when people bother us we wish that they were in that city. Now you can surely guess its name.

5. Now we come to the only important Canadian city that is not on an expanse of water. It is the capital of a province, is surrounded for many miles by very flat land with few trees, and was at one time the headquarters of the North-West Mounted Police. The name of this city means a queen. Now tell me what it is.

6. The person who selected the name for this city won a prize of two hundred and fifty dollars for it. It is small, very rocky, the farthest north and the most rainy of Canadian cities. But it has a splendid harbour, open all the year round, and supplies the greater part of Canada with frozen halibut and salmon. It is nearer to China and Japan than any other port in North America. Guess this two hundred and fifty dollar name.

7. This city, situated at the end of a long lake, is only surpassed in manufacturing by Montreal and Toronto, and has many branches of United States factories. It is close to the greatest source of electrical energy in Canada and surrounded by a splendid fruit-growing district. A city in Scotland and the capital of the Bermuda Islands have the same name. Can you guess it?

8. Can you name the city that stands sentinel over one of the lowest and most important passes across the Rocky Mountains and which also forms the gateway to our chief river emptying into the Arctic Ocean? It has a provincial university, is the capital of the province, though not the largest city.

9. This seaport is not on the ocean but at the mouth of an important river. High tides occur in the harbour. It is more than five times as large as the capital of the province in which it is situated. It has many saw-mills as well as manufactures. It is the only city in Canada that owns its own harbour, and it is named after one of the first persons mentioned in the New Testament. Its name is differently spelt from that of the capital of Newfoundland. Write the names of both.

10. This city is on one of the richest parts of the prairies and is on both banks of the largest river in the Prairie Provinces. It is an important railway centre. It contains a fine university, though it is not a provincial capital. It has the same name as a berry that grows in Western Canada. Guess the name and be sure to spell it right.

11. Can you guess the name of the city that stands near the entrance to a very important pass across the Rocky Mountains? It is prettily set down in the valley and upon the slopes of a branch of the Saskatchewan River. It is the largest city between Winnipeg and Vancouver, and is one of Canada's greatest markets for cattle and horses. It is not very far from the Prince of Wales's ranch. Name the city and the river which passes through it.

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

The railways of the United States are six times as long as those of Canada but no other country surpasses us except Russia.

London (7,476,000) is the largest city in Europe; New York (5,620,000) is the largest in North America; Tokio (2,178,000) is the largest in Asia; Buenos Aires (2,300,000) is the largest in South America; and Sydney (955,000) is the largest in Australia.

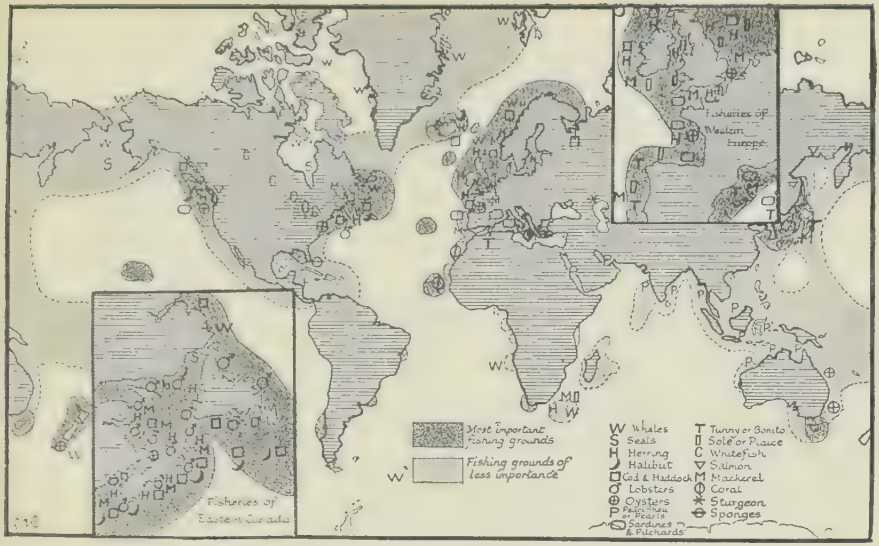


FIG. 95. THE HARVEST OF THE SEA

Find out from your parents or from an encyclopædia the appearance of the animals listed on the map. Where are the four most important fishing-grounds? What country borders two of them? From Map 1 in Atlas find the depth of water on the four chief fishing-grounds.

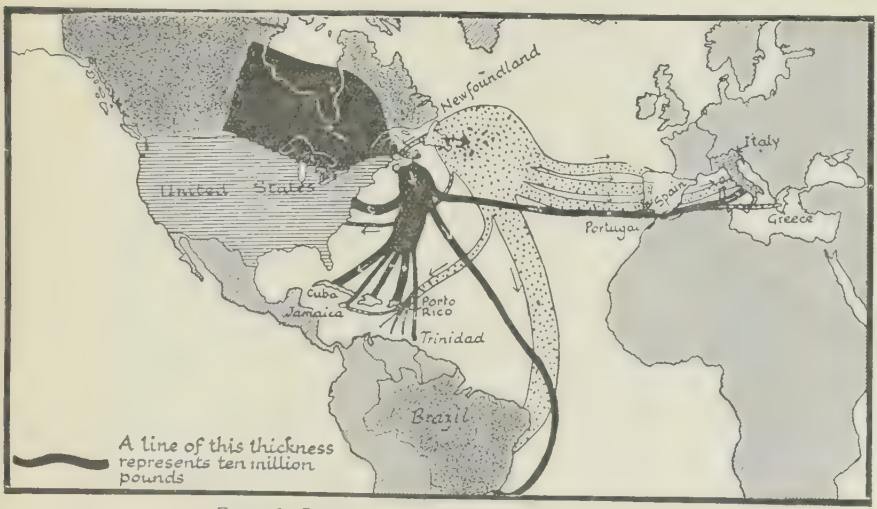


FIG. 96. CANADA'S CODFISH IN EVERY CLIMATE

The black represents the distribution of Canadian codfish, the dotted of Newfoundland codfish. What part of Canada's codfish is used at home and what part is exported? To what country does Canada export most? To what European country does she export largely?

By courtesy of Canadian Air Board, Ottawa.

FIG. 97. A SNUG FISHING TOWN: LUNENBURG

How many fishing schooners are there in the harbour? How many masts has each schooner? Why are the boats all pointing in the same direction? Describe how the wharves run. What signs are there that the adjacent land is not fertile?

CHAPTER XI

THE WORLD'S LAST GREAT SAILORS

FISHING ON THE BANKS OF NEWFOUNDLAND

The fishing-grounds. The coast of Nova Scotia, New Brunswick, and Newfoundland is an embroidery of islands, capes, and bays (Map 21 in Atlas). Swarming in the meshes are the plants and small animals on which fish feed. Farther out, at a distance of fifty to one hundred miles from the coast, rise platforms over which the sea is shallow. These *banks*, as they are called, are the feeding-grounds of the largest schools of cod, halibut, haddock, and hake that the sea can boast.

Thousands of men all round the coast, who go out each day in their motor-boats to catch fish in the inlets or near the coast, are called the *inshore fishermen;* while those brave, dogged men who grimly sail out to fish on the Banks, there to be buffeted by wind and wave, are called *deep-sea fishermen*.

The Grand Bank, extending along the south of Newfoundland, is the most productive of all fishing-grounds. Here for four hundred years these daring sailors have steered their little ships from Newfoundland, Nova Scotia, the United States and Europe to capture the prizes of the sea.

The inshore fisheries. Little fishing villages are to be found in every inlet along the coast of the Maritime Provinces. The methods of fishing differ with the kinds and habits of the fish caught. Traps for lobsters are set in shallow water throughout the season, and are raised once or twice a week. Mackerel are captured in trap-nets along the shore or in immense seines in open water. Oysters are scooped up by hand dredges on the end of a pole in a few places where they have not been exhausted. Young herring are taken in immense numbers in the Bay of Fundy and packed in tins to be sold as sardines. Cod, haddock, and halibut are either caught by hook and line or trawls in the same way as on the Banks.

Lunenburg fishermen. Over one hundred and fifty years ago a band of sturdy exiles from Germany settled along one of the little inlets on the coast of Nova Scotia, which they called Lunenburg Bay (Fig. 97). The quiet waters of their land-locked harbour invited these brawny, courageous

men to the sea. To-day the bulk of the Canadian fishing fleet for the Banks of Newfoundland sails forth from this little port.

The fishing schooner. Before the fishing season opens the harbour of Lunenburg is dotted with strong, wooden, two-masted fishing schooners. These boats (Figs. 98 and 99), with their sails as white and stiff as marble, present a beauty of outline and a bird-like grace not surpassed by any other ships. Yet they are built entirely by the handy fishermen who own and sail them.

Let us take a trip on one of these fishing schooners to the Banks of Newfoundland. The crew of twenty-two consists of the skipper, a man of skill and judgment; the cook, whose art in the kitchen keeps all the men in good humour; and twenty fishermen, two for each of the small boats.

As we step down the steep stairway at the front of the deck we find ourselves in a room with sleeping-bunks on both sides; behind this is the dining-room, none too large for twenty men. At the back of the ship is a cabin in which the captain has his quarters. Stoves keep these rooms comfortable and are necessary to dry the wet clothing of the men.

The dories. As the ship steers her course to the Grand Bank let us look over her equipment. Ten small boats called dories fit within one another like a nest of berry-boxes. To the landsman these wonderful little structures appear as unsafe as a birch-bark canoe; yet a skilful fisherman can row and sail one through the roughest sea, even when loaded with fish to the water's edge. Often when they get separated from their schooner in a sudden squall the fishermen will reach land, one hundred and fifty miles away, in this staunch little craft.

The fishing-gear. At last we approach the fishing-grounds and the gear is got ready. Long lines of very strong cord, called *trawls*, have pieces thirty inches long, called *snoods*, spliced in every three feet. At the end of each snood is a strong fish-hook. As each hook is baited, the line is coiled in a tub.

Finding the fishing-grounds. The skipper does not fish haphazard, but always selects a ground that past experience has proved to be productive. There is no land in sight. How can he find the ground? The sounding-lead, which is his third eye, is a metal cylinder, the hollowed bottom of which is covered with tallow. He lowers this to find the depth and also, by examining the mud adhering to the tallow, to learn the character of the bottom. By two or three soundings his experienced eye tells his position, and he goes directly to the fishing-ground.

Thirty thousand baited hooks. Three or four tubs of fishing-gear are now loaded into each of the dories, which are swung out over the side of

By courtesy of Mr. C. A. Matthews

FIG. 98. A FISHING FLEET IN THE MARITIME PROVINCES

Compare a man on one of the boats with a mast, and then say about how tall the mast is.

By courtesy of F. C. C. Lynch, Director Natural Resources Intelligence Branch, Department of Interior, Ottawa.

FIG. 99. A FISHING SCHOONER STARTING FOR THE GRAND BANK

About how long is the ship? How many masts has it? How many sails are on each mast? How many men can you count on the ship?

By courtesy of Mr. C. A. Matthews.

FIG. 100. FISHING ON THE BANKS

This shows the old method followed for hundreds of years. The fishermen used lines and fished from the deck of the schooner.

the schooner, each manned by two fishermen. One small boat is let free at every half-mile, and immediately the long trawl is let out by one man while the other rows. Attached to the two ends of the trawl are anchors, which keep it stretched along the bottom, and small barrels which float on the surface to mark its position. Thus when the ten trawls are all out, they are spread over an area five miles long and more than two miles wide. Every line offers three thousand choice morsels to cod, halibut, haddock, and hake, but behind every piece of bait lies hidden a treacherous hook.

Some marvels of the sea bottom. After several hours, the strenuous work of lifting the trawl begins. One fisherman in oilskins, standing in the bow of the dory, tugs in the line over a pulley and shakes off the fish into the boat; the other removes the bait and coils the trawl in the tubs. Some wonderful objects come up on the trawl. First a fine codfish over three feet long is pulled over the side (Fig. 100). A little later the fisherman knows by the heavy dead weight that a large lumbering fish is coming; its outline can now be dimly seen; it is as broad and flat as a door. As it appears at the surface the fisherman shakes it off in disgust, for it is only a barn-door skate, which is of no value. Then cod after cod comes up in quick succession. Sometimes a beautiful purple and red starfish is attached to a hook, sometimes a sea-strawberry, which looks not unlike a large red fruit, but is really a sea animal. Frequently what appears to be an ear of corn is brought to the surface, but in reality it is the clustered eggs of a sea-snail. But often the fisherman utters an oath as he brings to the surface a graceful fish, steel-blue above and pure white beneath. When he tries to release the hook from its wiry mouth, the creature squirms and pierces him with sharp hidden spines, which bristle from its back like bayonets. This is the dogfish, cursed of all fishermen, not only for its murderous spines, but also because it eats the other fish from the hooks, and tangles and bites in two the trawl.

The catch. The last anchor has been lifted, the trawl-line is all coiled neatly in the tubs, and the dory is loaded to the water's edge with its harvest of cod, haddock, and hake. The little boat rides the high waves like an egg-shell as the fishermen row to the schooner. The skipper counts the fish as they are pitched on the deck. The men watch the count just as eagerly, for their monthly wage depends upon the amount of the catch of their dory. As boat after boat is unloaded, the rising tide of fish covers coils of rope, boxes and barrels, and the men stand knee-deep in the slippery mess.

Though the men are tired, the fish have all to be gutted, washed, and packed in ice, or salted in the hold of the vessel. When they are packed in ice, the schooner returns to port in about ten days in order to

dispose of the fresh fish. When the fish are packed in salt, the boat may remain on the Banks for six weeks, till a full cargo is obtained. Then it returns to port, and the salted fish are spread in the sun to dry. Streets, yards, and wharves of Lunenburg, Halifax, Canso, and many other fishing towns have, throughout the summer, acres of platforms covered with codfish drying in the sun (Fig. 101).

Dangers on the Banks. Such is the routine of the deep-sea fisheries. But it has many dangers. Often when the dories are busy setting or raising the trawls, a damp south-east wind from the Gulf Stream (Fig. 103) blows in a bank of fog as dense as wool. Though the eye cannot pierce fifty feet, the dory is five miles from the schooner. As the treacherous fog may persist for days, winds and currents often carry the little boat far from the fishing-grounds. As each dory carries only a small quantity of fresh water and food, the danger of starvation is real. Sometimes, as the brave little fishing schooner beats her way through fog and gale, a great ocean liner suddenly looms up like a ghost in the gloom and breaks her like an egg-shell. The gales that often sweep suddenly in are the worst enemies, and every autumn in the Maritime Provinces there are vacant places in many fishermen's homes because of the little dories that never returned to the schooner.

A long journey. Autumn has come. The season's fishing is over, and the schooners throng the snug harbour of Lunenburg. All is great bustle and excitement. The fish, now dry and packed, have been stowed away in the hold, and the fishermen are bidding farewell to their families, for they are about to start on a long and trying trip. They are going to deliver their season's catch to the West Indies, or Brazil, nearly five thousand miles away.

Through the westerlies. Out of the harbour on to the broad Atlantic each schooner sails with a fair wind. Bubbling water curls away from her graceful rounded stem, and her bellied white sails gleam in the sun. She is headed proudly for the south and is crossing the region of *westerly winds*. Though west winds prevail, gales are liable to hit her from any quarter. The water is cold, for she is in the branch of the Labrador Current that flows south along the coast. In a few days the weather becomes wintry. For many hours a driving gale dashes salt spray over the deck and sails, and soon the ship becomes enshrouded in ice. The howling wind and biting sleet mock the seamen's strength, and set at naught their skill. Snow and ice weigh down the ship, and the crew, freezing and exhausted, are hardly able to make her obey her helm.

The magic of the Gulf Stream. But in a few hours a sudden change

By courtesy of Mr. F. C.

FIG. 101. DRYING THE CODFISH

Notice the platforms on which the codfish are drying. How are these constructed? How is the dried codfish carried? What are the men doing with the dried fish?

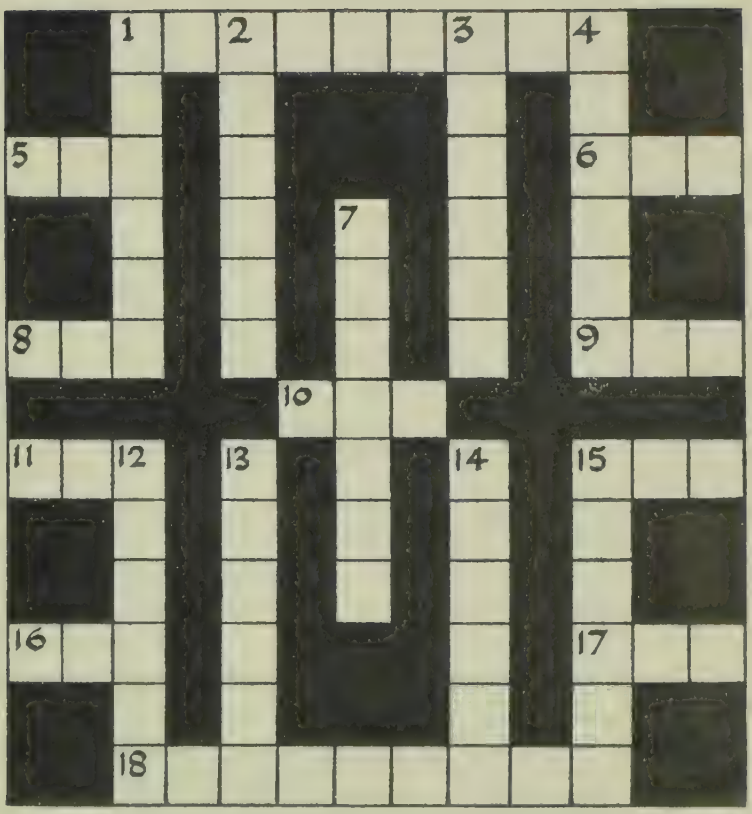


FIG. 102. A CROSS-WORD PUZZLE OF CANADIAN GEOGRAPHICAL NAMES

Horizontal

1. A large lake and river in Northern Alberta. 5. A small badly named island just south of Baffin Island. 6. The most valuable fish caught on the banks of Newfoundland. 8. The first three letters of the second largest city in Manitoba. 9. Abbreviation for our country. 10. Abbreviation for one of the Prairie Provinces. 11. The most valuable product of Northern Canada. 15. First three letters of the name of Canada's largest lake. 16. Abbreviation for largest province in Canada. 17. Abbreviation for country south of Canada. 18. The zone in which is the greater part of Canada.

Vertical

1. A district in Northern Ontario, north-east of Lake Superior. 2. A very large bay in Northern Canada. 3. The largest city in New Brunswick. 4. An ocean north of Canada. 7. The most populous province in Canada. 12. The last word in the name of the most northern ocean terminus of a transcontinental railway. 13. The name of a valuable evergreen tree in Canada. 14. The capital of Canada. 15. The tree that produces most lumber and pulp in Canada.

gives them hope. They enter the *Gulf Stream* (Fig. 103). This great Amazon of the ocean sweeps on more water than all the rivers of the land. It carries the tepid waters of the Gulf of Mexico almost to the coast of Newfoundland. Its deep indigo blue is markedly different from the light turbid green of the ocean water that forms its bank and bottom. The line of contrasting colour tells the shivering sailors that their schooner has entered this stream. In an hour she has passed from the depth of winter into water of summer heat. Ice and snow fall away as though melted by some invisible stove, the sailors bathe their frosted limbs in the warming waters, and gloom gives way to gladness.

The horse latitudes. We have now reached the latitude of Florida. Up till now, though the winds have been variable, they have never been absent. Now they steadily weaken, the sky becomes clear, and the air dry and invigorating. At last the wind drops entirely, and the sails flap limp in the stagnant air. Day after day the ship lies becalmed like

> ". . . . . a painted ship
> Upon a painted ocean."

We are now in the *tropical calms* or *horse latitudes* (Fig. 103). In earlier days sailing vessels, loaded with horses for the West Indies, were often delayed so long here that the animals died of thirst and had to be thrown overboard. So this belt was called the horse latitudes.

A meadow floating in the ocean. As we seize every breath of air to carry our ship to the south a new difficulty arises. Even when we were in the Gulf Stream, matted masses of greenish-brown seaweed went floating past. Now the tangles become worse and look like floating meadows on the bosom of the ocean. The schooner finds great difficulty in forcing her way through these clotted networks that seem firm enough to walk on. The weeds teem with living creatures of strange shapes and startling brilliancy. Fishes, of exquisite beauty, flash through the meshes as they feed on the small creatures living on the weeds.

The sailors now know that they are in the *Sargasso Sea*, well known since Columbus's small ships, during his first voyage, became almost entrapped in its treacherous grip.

The steadiest winds in the world. After two weeks' struggle southward through calms and tangles of weed, the schooner begins to feel the strength of the *trade-wind* (Fig. 103). Within two days she is in a new world. The uncertain, boisterous winds of the North Atlantic are left far behind. Now winds blow with genial steadiness day after day and week after week; this gives a uniformity of weather that needs no forecasts. It is

usually fine, and the sky is covered with patches of fleecy clouds, but there is no rain. Though the temperature is high, the air is dry and not depressing.

A belt of cloud that encircles the earth. Before the Equator is reached, the north-east trade-wind begins to weaken, the sky becomes more cloudy, and the air hot and humid. At last the wind sickens and dies, and the schooner is held up in the *doldrums*. This belt of calms, where the north-east and south-east trade-winds meet, stretches right around the world. It is much dreaded by sailors, for in it a ship may lie for weeks on the hot, smooth water under a leaden sky, with pitch oozing from the decks. It is a region of unbearable calm broken by violent squalls, torrential rains, and fearful lightning and thunder, while the muggy, hot air gives one a feeling of unconquerable weariness. But for the awning of the ship and the little air put in motion by the flapping of its sails, the heat would be almost insupportable.

In the south-east trade-wind. After two weeks' struggle in this place of torment, the schooner at last crosses the Equator. The breeze from the south-east begins to freshen, bringing with it clear sky and equable temperature, so that the plague of the doldrums is soon forgotten, and cheerful faces replace the sleepy sluggishness that had weighed down the crew. We are now in the south-east trade-wind. In ten days this wafts us into the magnificent harbour of that wonderful city—Rio de Janeiro.

QUESTIONS

1. A lady wears a coral necklace and a brooch set with pearls. From what countries did these articles probably come? (Fig. 95.)

2. Ambergris, caviar, trepang, dulse, sepia, pearl, coral and Tyrian purple are products of the sea. From the dictionary or encyclopædia, find out what each is, where it is obtained, and for what it is used.

3. When ladies in certain parts of Brazil give an afternoon party, they tell the guests to come before or after the thunderstorm. Do they live in the doldrums or the trade-wind belt?

4. In which direction across the Atlantic do ships follow the Gulf Stream?

5. Find the names of all the fish to be bought in a shop. Which are fresh? Which salted? Which canned? From labels on cans and boxes find out whence the fish came.

6. What is a finnan haddock? Look in the dictionary for the derivation of the name.

7. The chief fishing towns in Western Canada are Prince Rupert, Vancouver and New Westminster; in Eastern Canada, Halifax, Lunenburg, Yarmouth, Canso and St. Andrews; in the United States, Gloucester and Boston; in Great Britain, Aberdeen, Grimsby, Hull and Yarmouth; in Norway, Bergen; and in France, Boulogne and St. Malo. Find these towns in the Atlas, and from Fig. 95 tell what fish are landed at each.

FIG. 103. A SAILING TRIP FROM LUNENBURG TO RIO DE JANEIRO
Name in order the regions through which the ship passes.

By courtesy of Chief of Air Force, Washington, D.C.

FIG. 104. THE GREATEST COLLECTION OF GIANT BUILDINGS IN THE WORLD

This is an air picture of the business section of New York City. Battery Park with the round aquarium stands in

CHAPTER XII

ACROSS THE UNITED STATES BY AEROPLANE

The gem of the United States. Turn to your map of the United States and find its capital, Washington, for it is there that we are being strapped into the observation chamber of our aeroplane to look down like a bird as we skim across the United States and back. The graceful lines of the beautiful city take form as we ascend. The shining white Capitol, or parliament buildings, is the hub, and broad avenues bordered by graceful trees branch out like spokes. Threading its way through the city is the swift Potomac River, which can be traced back to the Blue Mountains in the west. Even before this stately city was born, it was bounded and planned by George Washington, the first president of the United States. Viewed from our high perch, magnificent Government buildings seem to stand everywhere. Solemn marble monuments to their greatest presidents, Washington and Lincoln, glisten in the sun. But there are few chimneys and little smoke to foul the blue of the sky. This, the handsomest of American cities, has few manufactures and little commerce. Its half million people are largely engaged in carrying on the government of the vast country with its swarming population, its unequalled resources, and hustling business.

Flats and sharps. Our trip north from Washington reveals the three parallel bands of the Eastern United States, each stretching like a ribbon from north-east to south-west. A gentle plain as smooth as the sea, save where cut across by rivers, borders the coast of the Atlantic Ocean. Next a rougher region rises abruptly from the coastal plain, and every river tumbles in a cataract as it passes from one region to the other. On this rougher band, called Piedmont, foaming white spots, scattered here and there on the sparkling lines of water, reveal rapids in these parts of the rivers. To the west beyond Piedmont rises the regular line of the Blue Mountains. We leave behind us great city after great city as we speed north. First Baltimore appears, then Philadelphia, and finally New York. It can be seen that the two former cities, and many others of lesser size, are along the line where the rough Piedmont suddenly drops to the coastal plain. Each city is spread out at the foot of a waterfall, which supplies power to run the great factories seen everywhere. Steamers plying on the rivers

across the coastal plain make every city an ocean port. The waterfall creates factories, the navigable rivers make commerce. Baltimore, as large as Montreal, is the world's greatest shipper of oysters. These are dredged from Chesapeake Bay, which can be seen as a blue arm of the sea to the east. As we proceed northward, great ocean steamers, looking like flies on a table, can be seen creeping up the river, which to the south widens into Delaware Bay. These steamers unload their cargo at the old city of Philadelphia.

All the world in one city. As our humming aeroplane advances to the north, towns become larger, more numerous, and closer together, until at last they all blend into one great, throbbing swirl of streets, houses, and factories. We know that we are now above the city of New York, the city of sky-scrapers, the pulse of the Western Hemisphere, the second largest city in the world. In Fifth Avenue palaces below us are housed the largest group of millionaires on the earth, while in the great, dingy, box-like, tenement houses in the slums are hived the most motley mixture of human beings the world possesses. Every nation under heaven has poured its quota into this vast melting-pot. There are more Jews than are found in Jerusalem, more Italians than are found in Rome, more Irish than in Dublin, and more Germans than in Cologne, Munich, or Leipzig; it has Polish centres, Greek centres, Czech centres, Magyar, Russian, Armenian, Syrian, and Rumanian centres. Its wealth is almost fabulous. In its business heart at Manhattan Island are packed half a million people to the square mile. Land is so dear that great sky-scrapers, thirty and forty stories high, border the canyon-like avenues. Tens of thousands of people swarm out of a single building into the street. To carry such crowds, not only have railway tracks been built on and above the streets, so that railway trains rattle past your third-story window or over the tops of houses, but also there are three underground tunnels one below the other, and yet the crowds cannot be quickly moved to their homes. As we gaze down on this human beehive we try to find what magnet has drawn the world to New York. Lying to the east is a well-protected harbour in which ships swarm like sparrows on the road. The greatest liners, floating palaces, carry passengers to and from every port; and tramp-ships, loaded to the water's edge, have stowed in their holds every product that grows on the earth, every creature that swims in the sea, and every article wrought in the factory. One hundred and twenty millions of the greatest hustlers in the world are feverishly digging minerals, raising crops and animals, cutting forests, and making articles of every kind, from beads to bridges, and shipping them to every nation, and almost half of the exports crowd

Fig. 103. Air View of New Orleans
What is the name of the river?

By courtesy of Buffalo Chamber of Commerce.

FIG. 106. AERIAL VIEW OF THE CITY OF BUFFALO

By courtesy of Duluth Chamber of Commerce.

FIG. 107. IRON ORE DOCKS AT DULUTH

Great bins are filled from cars that run on tracks. Tubes run down from the bins to the holds of the boats. How many rows of cars are on the docks? How many hatches are on the decks of the boats? How many boats are at the docks being loaded? Find Duluth on the map of the United States.

through this great port. But these hundred and twenty millions of the freest spenders buy from every country, and over one-half of these imports pass through the narrow throat of New York City. Far to the west, in a hazy blue line, frown the ramparts of the Appalachian Plateau, forming a wall between the coast and the interior. Not a break can be seen along its continuous height. In the north it curves away to the east.

Cities like a string of beads. The whole coast seems hemmed in, but as we look carefully from our aeroplane we see a clean furrow ploughed through this frowning, rocky barrier. Through this furrow threads a streak of blue water, which empties into New York Harbour. We have found the secret of this city's greatness. It is this Hudson Valley, the gateway between the interior and the coast. As we turn northward along this valley we find it streaked with railways, and a steady procession of trains, which look like lines of little black boxes, pulse along its length day and night throughout the year. The cities and towns along the banks of the river are so close together that it looks like one elongated necklace of factories, streets, and houses. At Troy it leaves the Hudson River and turns west into the Mohawk Valley, through which runs the Erie Canal, the largest and one of the oldest in the United States. Below in this fibre of water is a continuous procession of barges. The necklace of towns continues. What goes on in this five-hundred-mile necklace, each bead of which is a busy town? The canal and river navigation started them, electrical power from Niagara and other sources has given them new life. Each town has its special work. Nine out of every ten men in the United States wear a collar made in Troy, one-half of all the gloves that decorate the hands of American ladies are made in the homes of Johnstown and Gloverville workpeople. In the United States every second handful of soda put into the boiler to soften the water, and every second spoonful of soda put into dough to make it rise, is made by electricity in Syracuse from the salt beds that underlie the city. Over one-third of the workers of Utica are knitting stockings, underclothing, and sweaters. Three-quarters of Schenectady's bread-winners are engaged in the General Electric or American Locomotive works. Buffalo, at the west end of the line, is a funnel through which pour wheat, corn, oats, and other products of the west from large lake boats into Erie Canal barges. Her immense grain elevators and miles of docks are evidence of shipping which is greater than that of Liverpool.

Cities belching fires. From Buffalo we wheel south to the Appalachian Plateau just as the darkness of night approaches. Glowing flames widely scattered in the distance catch our eyes. Are the forests on fire? No, there are few signs of trees. As we approach we are amazed to find that each

patch of fire is a town with flames belching forth from numerous chimneys, as though the town were set down on a hundred volcanoes. We pass directly over the one that is largest and brightest and learn that it is Pittsburgh, the world's greatest manufacturer of iron. We are in one of the largest and oldest coalfields in the United States. One hundred years ago local iron ore was smelted by local coal and limestone into iron, but now the production of iron is expanded so much that the local supply of ore is a mere nothing. We see the headlights of numerous locomotives, on dozens of railways, rushing forward with long trains loaded with iron ore, which was brought down from Lake Superior and unloaded at Cleveland, Erie, and Buffalo, on Lake Erie. Lines of coal cars, miles long, great ovens for turning coal into coke, clouds of smoke, dirt, mountains of waste, volcanic smelting furnaces, streams of fiery molten iron shooting out into moulds, sizzling pools of cooling iron, great presses and rollers shaping masses of hot iron and steel into every form as though it were putty, clanging cranes running on tracks and carrying plates of iron weighing tons, fearful noises, and sweating men are everywhere in the towns and cities around Pittsburgh.

There go the ships. From fire, din, and dirt we turn to the north-west, and by morning the beautiful waters of Lake Erie are in sight. As we move westward city after city passes before us; first Erie, then Cleveland, which is as large as Toronto, Toledo, and many others of smaller size. The lake is dotted with great steamers loaded to the water's edge with iron ore. We bring our aeroplane down near Cleveland, the largest of all the cities, and hover above to watch hundreds of ships loading and unloading at the docks. Just below us one, looking like a giant whale, has just tied up. In an instant great openings in the deck, called hatches, are uncovered, and soon immense shovels are scooping the iron ore from the boat. Two iron shells controlled by chains are dropped into the opening through the deck and then brought together like clam-shells under several tons of ore. At once they rise, swing over, and open to let the ore drop into cars standing on tracks by the boat. Thirty of these work ceaselessly, and in two hours the boat is unloaded and is moved off to another dock to receive a load of coal for the ports on Lake Superior. Whole cars are lifted bodily and the coal is dumped into the boat, so that in another hour the ship, loaded heavily, is steaming out of the harbour for Chicago or Duluth.

Motor-cars by the million. As we leave Lake Erie we wheel a little to the north and catch a view of Detroit, the most rapidly growing city on the continent. It is the largest producer of motor-cars in the world. The rapid growth of this industry has made its population multiply four times in a few years, until now it is the fourth city in the United States. As we

By courtesy of Chief of Air Service, Washington, D.C.

FIG. 108. FROM FIRE TO ICE

Mount Shasta, California, from the air. This was formerly a volcano. How many cones are there? Describe the top of the nearest one. Find transverse cracks in the glacier in the valley between the two peaks. How steep is the slope?

By courtesy of Chief of Air Service, Washington, D.C.

FIG. 109. THE GRAND CANYON OF THE COLORADO RIVER FROM THE AIR

Describe the slopes. What is the nature of the surface and vegetation of the district? What kind of current has the river? Is there any cultivation in the region? Find a waterfall, an hotel, a bridge, a road and a path through the forest.

By courtesy of Portland Chamber of Commerce

FIG. 110. MOUNTAINS OF SALMON CANS
A cannery at Astoria.

By courtesy of California Prune and Apricot Growers

FIG. 111. A SQUARE MILE OF PRUNES
The prune is a dried plum. What kind of weather is necessary to dry plums in the open air?

look down we can see the advantages of its position. Great steamers passing up and down the river are as numerous as motor-cars on its main avenue. From the upper and lower lakes they carry freight to and fro from twenty miles of wharves. Long, narrow threads stretch westward toward Chicago and eastward over Southern Ontario toward Buffalo, the Mohawk Valley, and New York. These are the greatest railway arteries on the continent. The farmers' produce of the west surges eastward, and the imports of New York and the manufactures of the Eastern States are rushed west along these ever-busy lines. All pass through Detroit. We can see the famous Ford factories arranged in order and covering as much space as a dozen farms.

Where corn is king. But we must hasten on our trip. In an hour what a change from the rush and noise of Detroit! Here we are sailing over the flat, black plains of Indiana, with broad farms on every hand, and all very much alike. A spacious house and a very fat barn surrounded by numerous pig-pens, cattle-stables, poultry-houses, granaries, and very long corn-cribs, tell the story of progress and prosperity. Corn, corn, corn, everywhere! Fields as large as farms, with straight lines of corn ten and twelve feet high, look from the aeroplane like closely-printed pages taken from big books. This is the corn belt, and our aeroplane could fly swiftly for many hours over this vast area, which includes Ohio, Indiana, Illinois, Iowa, and Missouri. Of course we see wheat, barley, oats, hay, and other crops which rotate with corn, but here corn is truly king. As we skim near the ground we see on every farm great flocks of waddling, cylindrical pigs, and sleek, rectangular cattle. As these farmers do not sell their grain, but feed their stock with it, the corn belt produces more meat than any other region on earth. We can see everywhere the straight threads which we have learned to recognize as railways. At first they run north-west, then as we move west they run north, now, when we are still farther west over Illinois, they are running north-east. Great train-loads of swine and cattle are being rushed toward a pivot.

The world's greatest slaughter-house. We look for the meeting-place of all these railways. As we advance to the north the meshes of the railways become finer and finer; we are getting close to the centre of the web. The farms are giving place to towns and villages and the fields to houses and factories, and these become packed closer and closer, until at last we hover over the great city of Chicago, couched like a giant on the shores of Lake Michigan. No matter how high we mount on our aeroplane we cannot see the full reason for Chicago's great and rapid growth. Stretching eight hundred miles to the north-west and west are the greatest wheat-fields on

earth, those of Minnesota and the Dakotas, eight hundred miles to the south-west and south are the farms that grow one-half of the world's corn, and beyond these is another great wheat region in Nebraska and Kansas. Much of the corn and other grain is used to fatten the world's greatest flocks of pigs and herds of cattle. The wheat, corn, pigs, cattle, poultry, eggs, butter, and cheese are brought to Chicago to be distributed throughout the world. Its square mile of stock-yards, which we can see in the centre of the city, has a steady stream of stock trains running into it, and as steady a stream of pork, bacon, beef, lard, and dairy produce turning out of it in great refrigerator cars. This city is the world's greatest distributing centre and its greatest railway centre. Trunk lines connect it with the Pacific, the Atlantic, and the Gulf of Mexico. The waters of Lake Michigan wash its eastern border, which is a continuous line of beautiful parks, and the traffic by steamboat rivals that on the railways. Chicago, with a population of three millions, is now the fourth city in the world, but the western part of the United States, which forms its feeder, is only in its infancy. It is the ambition of every Chicagoean for his city to beat New York, and who knows but perhaps it may.

A sea of wheat. As we fly west from Chicago we can almost believe we are in Southern Ontario. Cattle are on every farm, and wagons loaded with cans of milk rush to the station to get their load on the train for Chicago. In every village and in many country places are creameries with great rows of cans on the front platforms, for we are now in the dairying region of Wisconsin.

Hour after hour as we glide along, forests and clumps of trees are becoming fewer and more scattered, rolling hills and hollows are giving place to flatter land, and fields of wheat and oats are becoming larger and more numerous. At last we are in the prairies of Minnesota and Dakota. As far as the eyes can see the broad fields of wheat stretch like a great sea, with here and there winding rows of trees revealing the course of a river. This is a part of the prairie wheat belt that is continued into Manitoba and Saskatchewan.

The land of the cowboy. But our journey is not yet half over, and as we speed forward the country becomes barer, the meshes of the iron network larger, and the threads of water thinner and fewer. They are down in deep ravines, which the people call coulées. The houses are farther apart and smaller, and instead of straight roads dividing the surface into a chequer-board, irregular trails, as though made by a frightened cow, form lines on the surface below. We know we are in a dry country. Herds of cattle roam at will over the bare land, and cowboys can be seen keeping an

By courtesy of Illinois Central Railway.

FIG. 112. THRESHING RICE IN LOUISIANA

What Canadian grain is threshed in the same way? Compare the size of bags of wheat and sacks of rice. Most of the United States rice is grown in Louisiana.

By courtesy of Spokane Chamber of Commerce.

FIG. 113. WHEAT PASSES FROM FIELD TO BAG

Cutting and threshing wheat is one operation in Washington, the greatest wheat State in the United States. How many horses draw the machine? How wide a swath does the machine cut? Does it cut it close to the ground or just below the heads? How many men are required for the machine?

By courtesy of Spokane Chamber of Commerce.

FIG. 114. A HYDRO-ELECTRIC POWER PLANT IN THE STATE OF WASHINGTON

On the left is a dam which has stored the water to form a lake in the mountains. To the right of the dam are four tubes through which the water runs down to the turbines in the power house. What becomes of the excess water not required for the turbines? Of what is the dam constructed?

eye on their stock. As we proceed toward the west, low hills appear, and instead of a covering of green, tufts of grass and grey sage-brush with patches of drifting sand mottle the ground (Fig. 120). Such harsh and niggard plants will not support cattle, but the close-cropping sheep have taken their place. We are now in the inhospitable ranch country of Montana and Wyoming, where the houses have shrunk to shacks or huts. Fierce withering heat in summer and cold biting blasts in winter produce the greatest seasonal contrasts on the continent.

Oases in the desert. The hills are now getting higher, the country rougher, and though everything is dry and parched, the rivers have more water than farther east. They are being fed by the melting snow of the mighty mountains which we are soon to see. Here and there in this desert land on the river banks, we see glorious patches of green on the sandy waste. We know that here the sure supply of snow-water is being used to grow bountiful crops of wheat, oats, alfalfa, potatoes, and perhaps sugar-beet.

Over the Rockies. At last away to the west we behold the serried rows of bare, jagged rocks flung across our path. As the sun touches them in the morning light they glow rosy red, some are bathed in clouds, others are covered with snow. These are the mighty Rockies, that stretch from north to south throughout North America. Forests wrap their base, then the trees thin and are replaced by grass-land, and this in turn shrinks before the cold of the upper reaches. Fields and fences, roads and bridges, houses and people, cattle and sheep are all left behind, and only bears wander through the forests, and wild goats and sheep crop the grass undisturbed on the lonely mountain side. As we mount high to get above the peaks we almost freeze, though wrapped with every bit of clothing available. Even breathing becomes quick and gasping in this thin air and our ear-drums press out until our ears ache. At last we have passed the highest range, but rows of peaks are still ahead. Below us now the country looks greener and fresher, the forests creep higher up the peaks and look denser than on the eastern slopes; the trees are larger. Clouds against the peaks are a sure sign that there is more moisture, and suddenly we plunge into a bank of cloud and almost lose our way. Our barometer tells us that we are descending; at last we are in a pelting rain which falls from the cloud through which we have just dropped, and we can see the earth below drenched with rain. Is the forest on fire? Here and there great jets of cloud shoot straight up as though from an explosion, but there is no glowing fire. As we come nearer to the earth the jets are seen to be steam belching from the earth. We know that they are geysers (Fig. 119), and that we are in the fairyland of the Yellowstone National Park.

Towns that die. Hour after hour we fly over wild seas of mountains containing, here and there, a human island—a group of rough houses, piles of rock, and great smoking chimneys, and for hundreds of miles around no other sign of man. These are mining towns set down among the mountains. From some of them millions of dollars' worth of copper, silver, and gold have been shipped by the railways that wind their way among the maze of mountains. In some towns all the houses are empty and falling into decay; there is not a person to be seen, and the streets run rank with weeds. In these dead towns the mines have been exhausted, everybody has gone, and only wild animals haunt the crumbling ruins. Such is the fate of mining towns built in places unfit for farming.

Harvesting wheat without binders. At last we are in the state of Washington; the muddy waters of the Columbia (Fig. 116) toss restlessly from side to side of the yawning canyon below, and high on the plateau above, the country looks dry and barren, yet wheatfields (Fig. 113) of immense size cover much of its surface. The rains of April and May stir the wheat seedlings to rapid growth, and the dryness and sunshine of July harden the ripe kernels. So dry is the crop when ripe that it does not require to be cut, bound in sheaves, and put in shocks. As we look down we can see locomotive-like tractors pulling giant machines, which cut off the heads of wheat, draw them into the machines, thresh out the grain, and deposit it in bags along the ground as the tractor advances. Occasionally we see twenty or thirty horses hitched together taking the place of the tractor (Fig. 113). Washington is the first wheat State in the United States, but wheat is not its only product. As we approach the Cascade Mountains we see in the valley of the Columbia River beautiful patches of green gleaming like oases among the harsh sage-brush and brown dusty sand. These are the most valuable apple orchards on the continent, and are continued northward into the Okanagan Valley of British Columbia.

Farms on the Pacific. We pass over the snow-capped Cascades, which are almost as high as the Rockies, and what a change meets the eye as we enter the valley between these mountains and the lower Coast Range which can be seen to the west! On the east of the Cascades the land is arid and brown, and the trees are few and stunted. In this valley the great fir trees rise everywhere like thousands of church spires; the green mantle of grass and the farmers' crops clothe the cleared patches, and beautiful farms much like those in Eastern Canada are seen on both sides of the Williamette River, which runs north to empty into the Columbia River. Standing guard near its mouth is progressive Portland, the commercial centre of the

By courtesy of Portland Chamber of Commerce.

FIG. 115. STRANGE RAFTS OF LOGS IN WESTERN UNITED STATES

How large are the logs? How are they bound together? What is the use of the uprights on the rafts?

By courtesy of Chief of Air Service, Washington, D.C.

FIG. 116. COLUMBIA RIVER FROM THE AIR

Find a railway on each side of the river. Why are railways built in such places? Describe the surface features of the region. Are there any rapids in the river? Are there plains in the river valleys? Is the region cultivated? Is it populated? Find this river on Map 25 of Atlas and trace it from its source to its mouth. What Canadian lakes does it drain?

Fig. 117. The Making of a Movie at Hollywood

Los Angeles's greatest industry is film-making. Describe the part of each person shown in the picture.

valley and a great port, with entrance to the Pacific Ocean through the Columbia River.

The world's greatest lumber yards. As we fly north through the valley, lumbermen are everywhere felling mighty firs and cedars, and loading logs as big as houses on railway cars or shooting them down slopes into streams. At first we see them moving the logs south toward Portland, but as we advance to the north the tide of logs turns and in increasing numbers the trains and rafts move forward (Fig. 115). At last a winding maze of waters, frayed into long, narrow bays and spotted with islands, appears in sight. Towns are scattered along its shores, but standing out pre-eminent is the fast-growing city of Seattle. Great saw-mills devour a continuous stream of logs and pour forth as steady a stream of lumber. Ocean steamers in a constant procession come up Puget Sound to unload the silk and rice of China and Japan, the oranges and lemons of California, the pine-apples and sugar of Hawaii, the gold, salmon, and seals of Alaska, and halibut and coal from British Columbia.

A Garden of Eden in a desert. We turn again to the south and retrace our steps. In a few hours the beautiful forests of the Williamette Valley are left behind. We are over a high, rough, dry country. To the right is seen the volcanic cone of Mount Shasta (Fig. 108), which at one time poured out molten rock, but is now resting grandly with its crown capped with snow. We still have the Coast Range, dry and barren, to our right, and the continuation of the Cascade Mountains to our left, but they are now called the Sierra Nevada, Spanish words which mean snowy mountains. Up their sides the moist winds from the Pacific Ocean blow and deposit their moisture as snow and rain. We are now above the marvellous valley of Central California, which is hemmed in between mountains and screened from all rain. Once it was a silent desert of drifting sand, without enough vegetation to bind the soil. But as we fly over its numerous villages, towns, and cities, its network of railways, and its numerous broad strips of green, we wonder what fairy has stretched over it her magic rod. The snow and rain on the Sierra Nevada are the agents that have made of the desert a garden. Reservoirs are built in which the rain is stored, and flumes lead this down to be greedily drunk by the dry soil, which sunshine and water make the most productive in the United States. Prune plums (Fig. 111) by the square mile, raisin grapes as far as the eye can see, patches of lettuce as large as Canadian farms, peach orchards covering counties, walnuts, olives, apples, plums, limes, oranges, figs, berries, lima beans, spinach, and asparagus cover fields varying in size from an acre to a township.

The golden gate to the Pacific. Up to the present not a gap has broken the crest of the Coast Range except where the Columbia River bursts through in a deep gorge. Now to the right, however, a low gap comes in sight and through it projects a blue arm of the Pacific Ocean. This gap is choked with towns, and at the narrow opening to the sea stands out grandly the city of San Francisco, for half a century the most notable city in Western America. Its beautiful harbour connects it with the Pacific Ocean, and the narrow gap through the mountains makes it the commercial centre of this fruitful valley.

As we skim farther south in this valley, our minds go back to other days before the water was brought down from the Sierra Nevadas to make it a Garden of Eden. Over seventy years ago, although this valley was difficult to reach, streams of frantic men from every corner of the earth jostled one another to stake claims in order that they might dig into its barren sand and gravel to seek for gold. So desperate was the rush that small tents were rented for forty thousand dollars a year, and ferrymen made over a thousand dollars a day carrying passengers across narrow streams. Most of the gold mines are exhausted, but a few years ago another feverish rush was made to its southern point, for out of bored wells gushed oil in great quantities, and it still continues to be one of the chief oilfields in the United States.

The place to live and the place to die. After we have reached the southern end of the valley and risen over a ridge, we behold another valley even drier than the one we have just left. But again the mountain to the east has made it a Garden of Eden overflowing with fruit and flowers. Not even Detroit and Chicago display such activity as stirs the inhabitants of fair Los Angeles, the city of flowers, beautiful homes, wide boulevards, and sunny skies. It is the health resort of the Pacific Coast. Wealthy people flock to it from every state, there to spend their declining years, and no city except Detroit has grown so fast. Its most important industry is the making of moving-picture films (Fig. 117).

America's wonder. We turn back toward the east and in a sudden plunge pass from beds of flowers and sweet-scented orange trees to the driest, most barren space in North America, called the Great American Desert (Fig. 120). Hour after hour we glide over this weary waste of sage-brush. Giant cactuses, bristling with spines, stand up lonely amid the lesser plants, and for hours not a stream is seen trickling through the thirsty sand. At last we see in the distance a furrow winding across the surface of the flat expanse (Fig. 109). As we come nearer, the eastern face of the furrow is lit up by the setting sun, and its different layers of coloured

FIG. 118. MAKING THE TURPENTINE FLOW

What is the man doing? What kind of instrument does he use? Of what race is he? The tree is a southern pine.

By courtesy of Northern Pacific Railway.

FIG. 119. GEYSERS IN YELLOWSTONE PARK

Find the position of this park on a map of the United States. How many geysers are shown in the picture?

By courtesy of Los Angeles Chamber of Commerce.

FIG. 120. YUCCA TREES AMONG DESERT SHRUBS

Mojave Desert, California. Find the position of this desert in the Atlas. Describe the Yucca tree. Describe the sage-brush.

rocks rival in brilliancy and variety the colours of the rainbow. This yawning canyon is more than a mile deep and from seven to eight miles wide, and at the bottom is a yellow streak of foaming waters. We are looking down on the Grand Canyon of the Colorado River, one of the greatest scenic wonders of the world. Desert borders it on both sides, and few tributaries tumble down its steep slopes. On and on we fly over desert, plateau, and mountains until at last the Rockies are once more traversed.

The cotton belt. Now we are advancing into the Great Central Plain. First sheep ranches, then cattle ranches are passed, until we reach the plains of Texas, and a flat prairie that gives every indication of a heavier rainfall. The streams are more frequent and larger, the surface looks greener, the cattle are more numerous, and field crops are rapidly replacing the grazing lands of farther west. A new crop meets our eyes as we gaze below. We have already seen cotton fields in irrigated land in Arizona, but now we look down on a sea of cotton bolls. All the land is not planted with cotton, but as far as the eye can see the white patches below are like the foaming crests on a stormy sea, and we do not leave this cotton belt until we reach the Atlantic Ocean twelve hundred miles away. Over four-fifths of the cotton that clothes all nations is grown in this belt.

The eye of the Mississippi. When nearly half across the cotton belt we see the Mississippi, Father of Waters, swinging its giant form from side to side over the flat plain which it has made. Some of the mud that stains its waters has come from Southern Alberta, much of it from the highest peaks of the Rocky Mountains, and the Appalachian Mountains have also given their share. We follow its course south until below us we see it breaking up into a thousand threads, like a piece of rope that has become frayed at the end. It reaches out its many-fingered hand far into the Gulf of Mexico. Railways work their way out among the strands, strange flat-bottomed boats wind in the same direction, and in the Gulf of Mexico can be seen steamers going to and from the same point. What is this magnet that draws to it the carriers of commerce? We hasten over the spot, and there swelters New Orleans (Fig. 105) in the midst of the hot, steaming marshes of the delta. Most of the ships and railways are loaded with great bales of cotton.

But we must hasten on. We have no time to describe the rice fields of Louisiana (Fig. 112), the great pine forests of Alabama, Georgia, and the Carolinas, the orange and grape-fruit orchards of Florida set like green islands in a sea of pines, nor the tobacco fields of Virginia and Maryland, for we have still many interesting things to see. South of the United States

lie islands and mainland countries which are of great importance to her and to us. We turn our aeroplane south-west and fly across the Gulf of Mexico.

Banana land. In a few hours we are over land again, the western lowlands of Mexico. It is wet and swampy and covered with dense forests. Occasionally we see cabins with their half-clad Indian owners gazing up at us. This is the country of the *trade-winds*, which blow from the east or the north-east almost every day in the year. Rain comes with the winds. We would not care to live here because of the heat, the rain, and the swamps.

Now we are passing over a large clearing. We see many white buildings, including houses, a store, and a hospital. Railroad tracks run down to a wharf several miles away, where a great white ship is moored. This is a banana plantation. It is owned by a wealthy United States company, which also owns the ships which carry the fruit to New Orleans, New York and other ports.

A cool land in the tropics. At *Vera Cruz*, Mexico's chief harbour, we turn to the west and begin to climb, for the interior is more than seven thousand feet higher than the coast. The climate changes; it becomes cooler and the rain decreases until, at *Mexico City*, the temperature throughout the year is like that of British Columbia in late spring, while the rainfall is scarcely enough for agriculture. As we fly along we see a great variety of plants growing. On the hot, wet plains rice, rubber trees, sugar-cane, and many tropical fruits flourish. On the slopes leading up to the plateau are coffee, cotton, tobacco, and other semi-tropical products. On the plateau itself are corn, wheat, beans, and other products of the temperate zone. We begin to understand what a difference there is between the *Hot Belt* and the *Torrid zone*, and to realize that *altitude* sometimes influences climate more than *latitude*.

Spanish America. The people of Mexico and of Central America are Spaniards, Indians, or mestizos (mixed Spanish and Indian). Their language is Spanish, their customs are Spanish, and the food, the clothing, and the houses of the wealthy are Spanish. The Indians and the poorer mestizos live in thatched huts. The men wear white cotton shirts and trousers, broad-brimmed hats with very high crowns, leather sandals, and no stockings. Their food consists almost entirely of corn and beans. The corn is cooked in a frying-pan over a charcoal fire into a sort of corn-cake known as "tortillas" (tor-té-lyäs), while the beans are made into "frijoles" (fre-ó-les).

Most of the Mexican people live on the uplands. They have two

worries: will there be enough rain to make a good harvest, and will the price of silver, lead, and copper keep their mines going?

On to Panama. South and east from Mexico City we fly above the seven states which, taken together, we know as Central America, until at last we reach the Panama Canal. We leave our aeroplane at Colon, the northern entrance, and embark on a ship bound from Liverpool to Vancouver, so that we may see what this great canal is like. For a time the land is so low and flat that we sail along at the same level as the ocean; then we enter locks which lift us eighty-five feet. A few hours later we descend to sea-level once more, and shortly afterwards we leave the ship at Panama, not, however, until we have seen the captain pay more than four thousand dollars in tolls. Our trip has taken ten hours, though the distance is only forty-five miles. We spend the night at Panama, and in the morning return to Colon by train, to rejoin our aeroplane for the homeward trip.

Our route lies straight north from Colon to the southern tip of Florida, though we turn far enough to the west to fly over *Jamaica*, where we see the "Union Jack" rippling in the trade-wind breeze, above Kingston, its capital city. Next *Cuba* comes in sight. The name reminds us of tobacco, until we remember that it is one of the world's greatest producers of sugar. Its capital, Havana, seems to be very busy. Cuban exports of sugar amount to ten thousand tons for every day in the year, and most of it goes through this port.

Florida lies beneath us. Once more we are flying over United States soil, and in a few hours we circle around the Capitol and land again in Washington.

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

Cotton garments are most common, and two-thirds of the world's supply of cotton is grown in the cotton belt of the United States.

More than half of the world's automobiles are run by gasoline obtained from the petroleum of the United States.

Two out of every three ears of corn grow in the corn belt of the United States.

Though the United States grows the most corn, Argentina exports the most.

The United States uses two-thirds of the exported raw silk and Paterson, New Jersey, is the largest manufacturer of silk cloth of any city in the world.

Detroit, Michigan, surpasses all other cities in the manufacture of motor cars.

Buffalo, N.Y., and Minneapolis, Minn., are the two greatest manufacturers of flour.

California grows and dries as many raisins as all the rest of the world, but Greece exports the most.

CHAPTER XIII

OUR SOUTH AMERICAN NEIGHBOURS

"Dad, what is South America like?"

Mr. Brown laid aside his newspaper. When Peter began asking questions, it was just as well to answer him at once.

"Why do you ask that, Peter?"

"Because our geography class is studying South America. Miss Graham has divided us in five groups, and each group is preparing a report to present to the class. Our topic is 'How is South America like North America?' It seemed easy at first, but I can't find very much about it in my text-book."

"You don't need a text-book to answer that question. It would not be fair for me to tell you how to prepare your report, but I will give you one suggestion: Use your Atlas."

"Use my Atlas?"

"Yes. Just that."

"But there is nothing there for me to read."

"Oh yes, there is. It is not always printed in words, but it is there all the same. Place a map of South America beside one of North America, and see what you can discover."

A week later Peter's report was finished. It was unusual, for it told nothing; it merely asked these questions:—

1. Imagine the Equator as a great hinge; if South America were turned on this hinge so that it pointed to the north, on what parts of North America would it rest? Where would Cape Horn be?
2. Which continent, South America or Africa, extends further south?
3. What city on the west coast of South America is almost directly south of Quebec? Its name begins with "V."
4. The most southerly city in the world is on the Strait of Magellan. How much further is it from the Equator than Vancouver is?
5. Which is nearer to Buenos Aires, New York or Liverpool?
6. South America has its least population where it is widest—towards the north; so has North America. Why?
7. South America's chief mountains are near the west coast; so are North America's. Which are the higher? Which are the wider?
8. South America has two lesser highland regions; so has North America. How do the location, the height, and the width of these compare?

By courtesy of Booth Lines (Amazon Cruise)

FIG. 121. A COTTAGE IN THE TROPICAL FOREST

Of what are the walls and roof of the cottage made? Has it a door? How do the leaves of the trees differ from those of Canada?

By courtesy of Boo

FIG. 122. NATIVES ON THE AMAZON RIVER

...escribe the native boat. How is the raft ...? By what signs in the picture do you know that the Indians are uncivilised?

9. Each continent has a great, low, central plain. In North America much of this plain is a hive of industry. Is the same statement true of South America?

10. North America has one great river flowing north, two flowing east, and one flowing south; so has South America. How do these rivers compare in length and in the area which they drain?

11. North America has its chief sea-ports on the eastern coast; so has South America. Why?

12. There are ten countries in North America. How many are there in South America, and what are their names?

"Peter, we can't answer those questions," exclaimed his class-mates.

"I do not expect you to now, but each one is answered on Maps **26** or **27** in your Atlas. Look them up there."

Three days later the geography class met to discuss Peter's report. The questions were read again, and this time there was no lack of response. Maps had been studied with a real purpose in view, and each question was answered satisfactorily.

Miss Graham was curious. "Peter," she said, "just why did you ask those questions?"

"I thought it would be more interesting if we found out things ourselves, and I am sure we shall remember them better. Then, you see, my first five questions show the position of South America and its direction from our own continent; the sixth tells us something about its shape. From the next three we learn important features of surface and what the Andes Mountains, the Guiana Highlands, and the Brazilian Highlands are like. In order to answer question 10, we must discover several facts about the Magdalena, the Orinoco, the Amazon, and the Plata river systems. The coastline and such important seaports as Buenos Aires, Montevideo, Santos, and Rio de Janeiro are disclosed in solving number 11. Of course we all know what we learn from the last question. Do you think my plan is a good one, Miss Graham?"

"I think it is splendid, Peter. In fact, it is so good that I am going to borrow it myself. Suppose that for our next lesson we answer the question, 'Who live in South America?' We will not get much help from our Atlas, but the geography readers in the library are full of information. Then, later on, there are several other interesting problems which we can undertake."

Who Live in South America?—

The early inhabitants. Columbus, with the aid of the Queen of Spain, discovered America in 1492. Explorers from several countries followed in his footsteps, with the result that England and France gained possession of most of North America's eastern coast. Spain secured what we now call Central America, almost the whole western coast of both continents, and

some of the south-eastern part of South America. About the year 1500 a Portuguese navigator entered the mouth of the Amazon River, and for the next three hundred years Brazil was a colony of Portugal.

When these Europeans came to America they found many inhabitants to whom they gave, incorrectly, the name "Indians." These people were alike in colour, but differed greatly in language, in customs, and in civilization. Some, particularly in North America, were mere savages. In parts of South America, on the other hand, lived a people in many respects more advanced than the white men who conquered them. The remains of their temples, their dwellings, their ornaments, and their tools show ability which even to-day we cannot equal.

The people of to-day. Spain conquered these wonderful people, killed their leaders, stole their golden treasures, and reduced them to slavery. To-day their descendants, though little better than primitive savages, form a considerable part of South America's total population of sixty millions.

The Indian is found in every country. Sometimes, as in Ecuador and Peru, he far exceeds the white man in numbers. On the other hand, in such progressive countries as Chile and Argentina less than five per cent. of the people are native. But wherever he is found the Indian is an unskilled, and usually lazy, man. His house is a cabin, or, in the hotter districts, even less; his clothing is as little as possible, and his food is often secured from the trees growing wild, at his door.

Three-quarters of the people who live in South America are white, and most of them are of Spanish or Portuguese descent, though, just as in Canada, other European countries are represented. In Brazil the official language and the speech of the people is Portuguese; in every other country, except the Guiana Colonies, it is Spanish.

Their occupations. What do the people of South America do to earn a living? Once more the Atlas will help us to answer this question. Map 27 is an Economic map, and on it all the continent's important products are shown. There are many of these, but a few moments' study reveals three interesting facts: (1) In the mountain districts minerals of many kinds are secured. (2) Rubber is almost the only product of the great lowland drained by the Amazon River. (3) The leading industry is agriculture, which is carried on, to some extent, in every country.

Mineral products. Minerals occur in mountains, so it is no surprise to find from our map that mining is the occupation of many of the people who live in the Andes Mountains. It was for gold, silver, and emeralds that Spain conquered these countries hundreds of years ago, and these precious

By courtesy of Dr. Wilson Popenoe.

FIG. 123. A TYPICAL ROAD THROUGH THE ANDES

Of what is the road built? Could wagons use it? For what kind of traffic is it built?

By courtesy of Dr. Wilson Popenoe.

FIG. 124. A POTTERY MARKET IN BOGOTA

...urtesy of Dr. Wilson Popenoe.

FIG. 125. THE MAGDALENA RIVER

How wide is the river? Describe the boats on it. What is the character of the land's surface?

By courtesy of Dr. Wilson Popenoe.

FIG. 126. ONE OF THE HIGHEST CITIES IN SOUTH AMERICA: QUITO

Are the houses high or low? Are the surrounding mountains bare or covered with trees?

things are still produced, silver being particularly important. Copper and tin, less costly but more useful minerals, are found in vast quantities. Nitrate of soda, which helps our gardens to grow and our munition-plants to make explosives, is one of Chile's resources.

Agricultural wonders. Ecuador is a small country, less than one-fourth as large as British Columbia. The map shows that cocoa, rubber, cattle, and cinchona, from which quinine is secured, are the leading products. The *Statesman's Year Book*, in the library, tells us that the farmers of Ecuador keep cattle and sheep and raise corn, beans, and wheat. Cocoa, and chocolate as well, are made from the fruit of the cacao tree, which, like the rubber tree, must have a much hotter and wetter climate than exists in British Columbia. Cattle and sheep, corn and wheat, on the other hand, thrive best in such a temperate country as our own. Ecuador should be hot, for the *Equator* passes through it; indeed, the name "Ecuador" means "Equator." How is it possible for a country in the tropics to raise products which belong to the temperate zone?

Other questions arise which puzzle us. On the coast of Chile is a long, narrow strip where sheep and cattle seem to be abundant. This strip stops at the thirtieth parallel of latitude, yet north of it there is a mining district which should furnish excellent markets for the cattle ranchers. Is there any reason why sheep and cattle are not raised further north on this coast?

Then, too, on the east coast, our map shows that cattle-raising is important in Argentina, in Uruguay, and in Southern Brazil. Why does it not extend further north in Brazil and further west in Argentina?

In North America the finest farming districts are found in the Central Plain and in the valleys of our great rivers. The land drained by the Saskatchewan–Nelson and the Mississippi–Missouri River systems furnishes food for the entire continent and provides a livelihood for millions of our people. Yet in the great lowlands of the Amazon River rubber and nuts are the only products shown on the map, and our geography readers state that few people live in all this vast land save scattered bands of Indians.

All of these questions may be answered with one word—*Climate*. Maps **28**, **29**, **30** and **31** will help us to understand it.

What is climate? We have heard people say, "What a delightful climate Victoria has!" If we ask them why they think it is delightful, we are often told that the weather is neither too cold in winter nor too hot in summer, and that there is enough rainfall, but not too much. Other factors enter into climate, but these two—temperature and rainfall—are not only the most important, but also the only ones which most of us ever think of.

When we studied "Heat Belts," we found that the "Hot Belt" lies toward the Equator, and that around both the North Pole and the South Pole are "Cold Belts." Naturally, we decided that temperature depends on latitude. Now we are to find other influences as well.

Is it always hot at the Equator? As three-quarters of South America lies within the tropics, we would expect to find high temperatures there. Suppose we compare it with North America. Map **11** gives the July isotherms for North America. The eighty-degree isotherm runs in a westerly direction across the southern part of the United States and then along the coast to Panama. Most of the land south and east of this line has an *average* temperature, during July, of eighty degrees. The north-

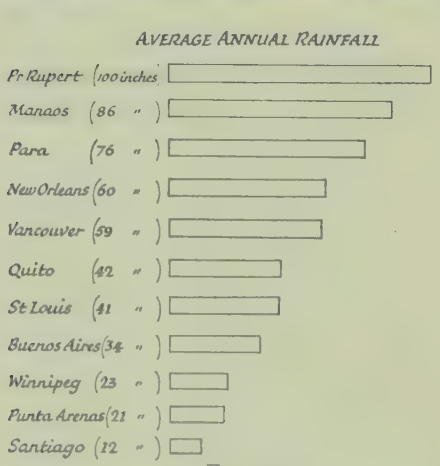

AVERAGE ANNUAL RAINFALL
Pt Rupert (100 inches)
Manaos (86 ")
Para (76 ")
New Orleans (60 ")
Vancouver (59 ")
Quito (42 ")
St Louis (41 ")
Buenos Aires (34 ")
Winnipeg (23 ")
Punta Arenas (21 ")
Santiago (12 ")

FIG. 127.

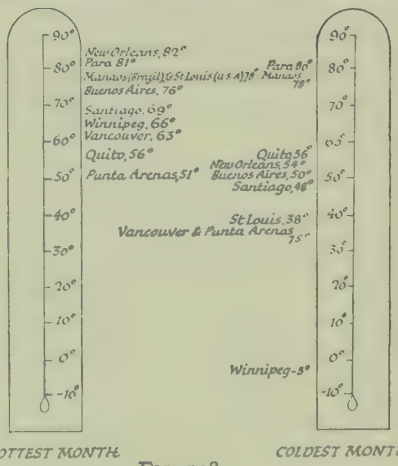


FIG. 128.

west corner of Mexico, however, together with a small fraction of the United States, is even hotter, for the map shows it to be enclosed by a ninety-degree isotherm.

South American temperatures are shown on Maps **28** and **29**. Where is the ninety-degree isotherm for January (the Southern summer)? Does the answer surprise you? Now find the area which has an average January temperature of eighty degrees, and decide if the Equator passes through any part of it. What isotherm includes the north-west third of the continent?

Part of Mexico and even a fraction of the United States, in the temperate zone, is hotter in July than any part of South America. During the summer, the average temperature at the Equator is not the highest on the continent (Fig. 136) and is, indeed, no higher than at St. Louis or New Orleans. What is the explanation?

By courtesy of Ferro Carril Oeste.

FIG. 129. SQUARE MILES OF GRAPE-VINES IN ARGENTINA

are the rows? How are the vines fastened up? How are they watered?

By courtesy of Ferro Carril Oeste.

FIG. 130. A MOUNTAIN OF WHEAT

got to the top?

By courtesy of Ferro Carril Oeste.

FIG. 131. SHEEP, SHEEP, AND MORE SHEEP

This represents a sheep-market in a town in Argentina. How many sheep-pens can you count? Count the number of sheep in one pen and reckon about how many there are in the whole yard.

Happily for our southern neighbours, within the torrid zone of their continent are some of the loftiest mountain ranges of the world. These moderate the climate of large sections so much that in many places there is perpetual spring, a continuous May or June; in other districts one may ascend, in a few hours, from regions of eternal summer to perpetual snow. Thus the mountains and plateaus of South America are effective in offsetting the influence of low latitude.

There is another reason. The temperature of water changes more slowly than that of land, so in hot countries the water is usually the cooler. On most of the north and north-east coasts of South America winds are constantly blowing from the cool ocean to the land, and these winds help to moderate the climate.

Is it colder in Patagonia than on Vancouver Island? Study the temperature maps of South America and of Canada to answer the question.

Rain! Rain! Rain! Read Map 30. Where is the greatest rainfall (Fig. 135)? How many inches of rain fall at the Equator? Why is there so much?

When there is a hot stove in a room, the air around it becomes heated and rises; cool air, from the sides of the room, comes in to take its place. On the surface of the stove there is a *calm*; on every side are gentle *winds*.

Suppose we move the stove to a different part of the room. Once again we shall have a calm and winds, but they will be in different places.

Near the Equator the earth is hot because the sun's rays shine directly upon it. The air above this land is heated and slowly rises, and we have a region of Calms, which we call *Doldrums*. To replace the rising air, the *Trade-winds* blow in from the north-east and the south-east.

When the stove was moved, the air around it also moved. In the same way, the Doldrums and the Trade-winds follow the sun south of the Equator in our winter and north again in our summer.

How does this cause rainfall? In two ways. In the Doldrums every afternoon for weeks at a time it rains. The warm air, which has risen, becomes cooled in the higher altitudes, and its moisture forms clouds and falls in rain. The climate here is always hot, sultry, and wet, so it is a miserable place in which to live.

Sometimes the Trade-winds bring rain; sometimes they do not. If they blow over the ocean, they collect moisture, which they carry with them until high lands force them to rise; then they become cooled and their moisture falls. When these winds blow over low land, however, they are drying winds. What influence will they have in South America?

$2 a gallon for water. On the west side of South America there is a

region where it almost never rains, and where fresh water sometimes costs more than we pay for milk. Maps 3 and 4 in the Atlas explain the reason. Do you remember reading in *The World's Last Great Sailors* about "Horse Latitudes" and "Westerlies"? If you study them again, together with Maps 3 and 4, you will understand just why this district is so dry.

The "A. B. C. Countries."—There are three countries in South America which are of greater importance than the rest. They are Argentina, Brazil, and Chile, and, because of their initial letters, they are often spoken of as the "A. B. C. Countries." Argentina is the most progressive, Brazil is the largest both in area and in population, and Chile has great, though unusual, mining and agricultural resources.

The "Canada of South America." This is a name which is sometimes given to Argentina. Do you think it is appropriate? It may help you to decide if you compare the areas, the population, the industries, and the future possibilities of the two countries.

Its Capital. Argentina's capital, Buenos Aires, a Spanish name which means "Good Airs," is the largest city not only in South America, but in the entire Southern Hemisphere. Its Spanish origin is everywhere evident —in the language of the people, the newspapers, and the signs over the stores. Indeed, Buenos Aires is the largest Spanish-speaking city in the world, its population being more than double that of Madrid.

The parks and avenues of the city are beautiful, and many of its public buildings and private homes are among the finest in the world. School buildings, though usually smaller than in Canada, are often superior in appearance. Admirers of Buenos Aires say that it has "the most beautiful opera house, the best street-railway system, and two of the finest newspapers in the world."

Such beauty and magnificence are only possible where there is great wealth. The city is the home of the richest people of Argentina. Many of them are owners of vast ranches in the country, ranches so large that they are measured, not by acres but by square miles, and their cattle and sheep are counted, not by hundreds but by thousands. Products of these ranches are shipped through the sea-port of Buenos Aires, and even larger quantities are exported from *Rosario* two hundred and forty miles up the *Parana* River. Both harbours admit vessels drawing twenty-eight feet of water.

Why is Argentina the most important farming country in South America? Along the Parana River, and extending hundreds of miles further south, are vast areas of flat, treeless land, called *pampas*. Pampas are like our prairies; their soil is as rich, and they are even more level.

But good soil is only one factor in successful agriculture. Climate is

Fig. 132. Buenos Aires
A city of magnificent streets and fine buildings.

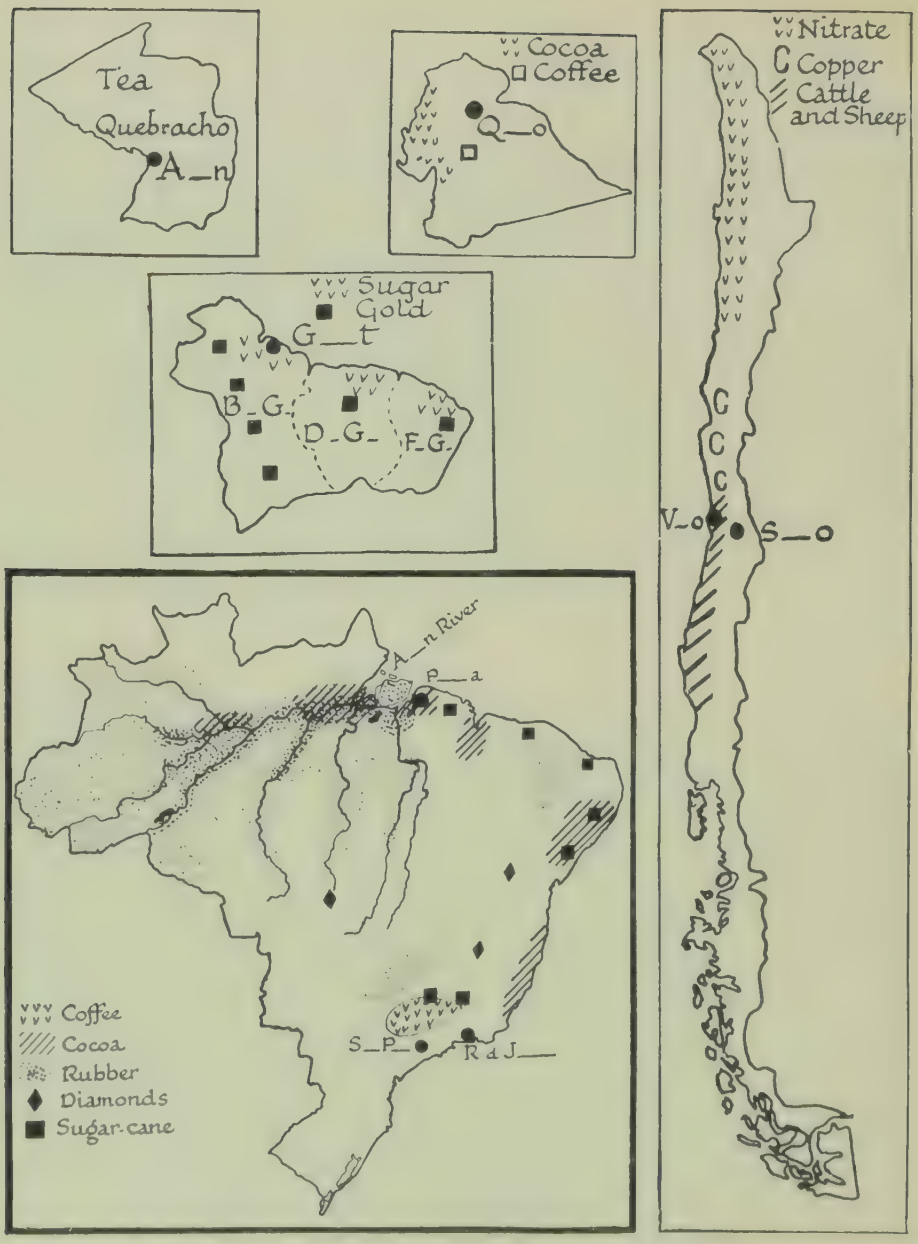


FIG. 134. SCRAMBLED COUNTRIES OF SOUTH AMERICA

With the aid of Map 27 in your Atlas find the name of each of the countries in the pictures. Fill in the names of the places whose initial letters are indicated, and find why each of these places is important. From the drawings write an account of the chief productions of each country.

at least as important. Maps 28 and 30 must be examined, and at once we see that it is hot enough, in the January summer, for wheat to ripen. Is there enough moisture? The answer is not so easily found, but, with care, we find that at the coast the rainfall is from twenty to forty inches a year; and that to the west this steadily decreases.

Argentina's great products are wheat, flax, corn, beef, mutton, and wool. Decide yourselves where grain-growing would be important and where you would expect to find stock being raised.

Transportation. Rich farming lands and good, natural roads are seldom found together. A heavy, black loam, free from sand and stones, will grow excellent crops of grain, but roads built of such material are almost impassable in wet weather. Argentina has poor roads everywhere except in the cities or where an occasional automobile highway has been constructed.

Perhaps as a result of this condition more railroads have been built in Argentina than in any other South American country. Some are Government-owned and most of the remainder have been built with British capital. The most interesting is the *Buenos Aires and Pacific* railroad, which runs from Buenos Aires to the western boundary of Argentina, where it connects with Chile's *Trans-Andine* road. Grades as steep as eight per cent. and different gauges on sections of the line, have reduced its usefulness. Though reaching an altitude of ten thousand, three hundred and eighty-five feet, it is not as high as a railroad in Bolivia.

More important than roads and of great help in the development of the country is the Plata River System. The Plata itself, two hundred and fifty miles long, is much like a gulf. It is formed by the union of the Parana and the Uruguay, and has a volume of water much greater than the Mississippi. The Parana, which is over two thousand six hundred miles long, is navigable for small steamers for two thousand miles.

Other products. Argentina is nearly twenty-three hundred miles long, just about the distance from Prince Rupert to the tip of the peninsula of lower California. A country extending so far from north to south must have many climates. Our maps show that the Gran Chaco (Great Forest) in the north, is warm in the winter and hot in the summer, and that it has forty inches of rain in the year; that the southern part of Patagonia has much the same temperatures as Vancouver Island, with less rainfall.

It is not a surprise then to find, from Map 27, that sugar is a product of the north, while wool and mutton are obtained in the south. Two unusual words also appear on this map, quebracho and yerba maté. The former, which means "axe-breaker," is the name of a very hard wood. It is used for railroad ties, though it is of greater importance for the tannin which

is extracted from it. From yerba maté the national drink of South America is prepared, a beverage which largely displaces tea and coffee.

A giant country. Brazil is one of the largest countries in the world. It is slightly smaller than Canada, but it has three times as many people. It produces two-thirds of the world's coffee, and it is second in the production of cacao. It has more than two thousand tobacco factories and hundreds of sugar and cotton mills. Only three countries in the world possess more cattle, pigs, goats, or horses. Yet large areas are still unexplored, other large areas are thinly settled, and only a small part along the eastern coast has made any considerable progress. What is the reason?

There are two answers: one is *Climate*, the other is *People*. You know already that the basin of the Amazon River is hot and wet for most of the year; such a climate is unhealthy, and people of the white race will not live in it. The population of Brazil numbers over thirty millions. One-half are white—chiefly Portuguese—the remainder are Indian, negro, or of mixed race. Are such people likely to be progressive?

Rubber. Brazil is the mother of rubber, yet the amount obtained there is only a fraction of the world's production. In 1926 the yield from plantations was six hundred and fifty-seven thousand tons; Brazil furnished thirty-seven thousand tons.

For a long time almost all the rubber used by man came from the wild trees of the Amazon valley. A far-seeing Englishman carried seeds to England, where they were germinated in Kew Gardens. The seeds were used to plant more trees. These, in turn, were used to start rubber "plantations" in Ceylon, Borneo, and Malaya, where to-day more than one million, three hundred thousand acres are producing, a monument to British enterprise.

Para, near the mouth of the Amazon, is Brazil's chief rubber city.

Coffee. Coffee grows best in a semi-tropical climate. The plants cannot endure frost, but too much heat is almost as bad. Yet Map 27 shows that all of Brazil's great coffee districts are north of the Tropic of Capricorn. How is it possible for the climate there to be cool enough? Consult Map 26 and you will understand it.

Most of the people of Brazil live in these coffee lands, for coffee is their great source of wealth. With it they buy coal, cotton, and woollens from Great Britain, wheat from Argentina, machinery and lumber from the United States, and wines and wearing apparel from France.

São Paulo, in the heart of the coffee district, is only a two-hour train ride from the capital, Rio de Janeiro. In the near vicinity is Santos, the world's greatest coffee port.

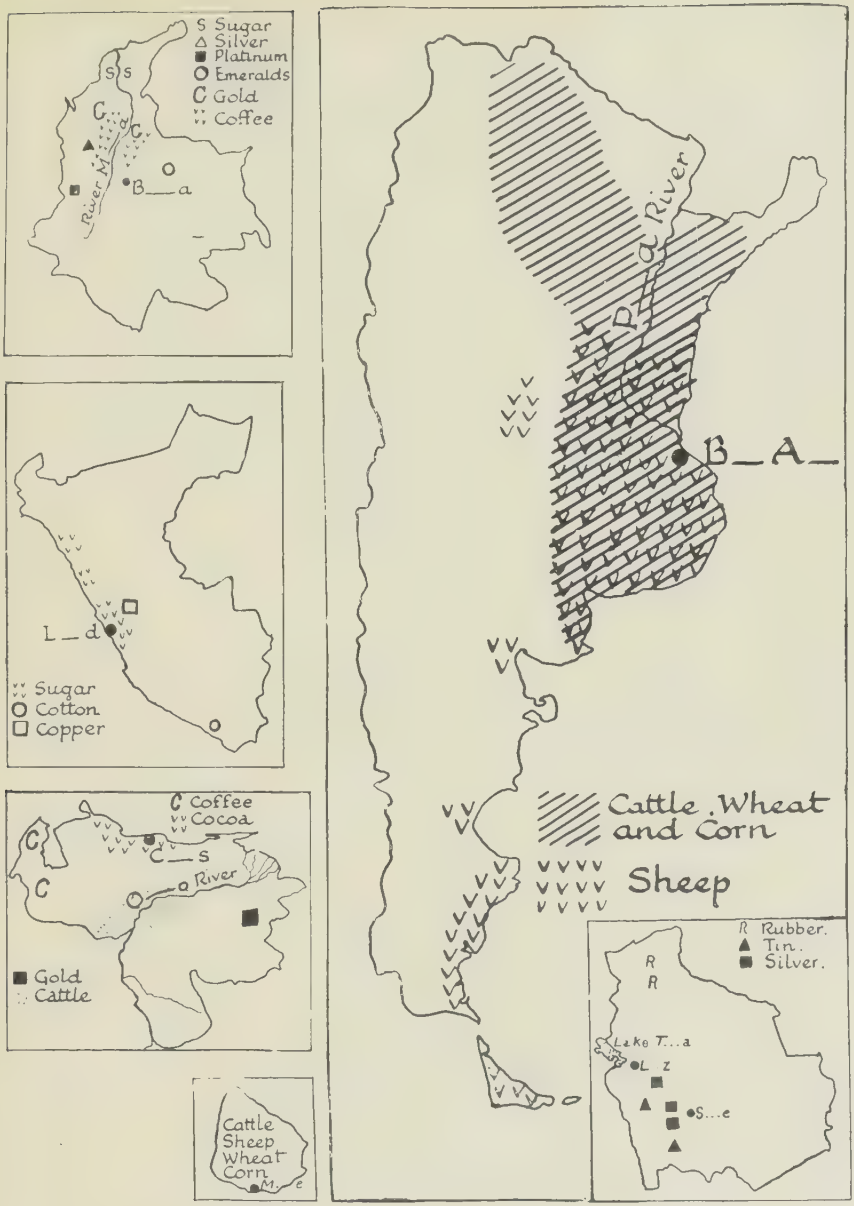


FIG. 135. MORE SCRAMBLED COUNTRIES OF SOUTH AMERICA

FIG. 136. TAPPING A RUBBER TREE IN THE AMAZON VALLEY
How thick is the tree? How many incisions have been

FIG. 137. IN BANANA-LAND
How many bunches grow on one tree? How tall is the tree?

The world's richest desert. Most deserts are tracts of dry, dreary, useless sand, but in Chile the Atacama Desert is worth more than all the rest of the country. Stranger still, if it were not a desert it would be worthless.

Nitrate of soda, commonly known as saltpetre, is a wonderful fertilizer for the soil. It is also used in the manufacture of explosives and to obtain a substance called iodine, which is used by photographers and by druggists.

Map 31 shows a desert extending along almost half of South America's western coast. It is a desert because there is no rain, and there is no rain because the trade-winds blow away from the land. The southern part of this district has large deposits of nitrate of soda. Nitrates dissolve in water; if it rained in the Atacama Desert the nitrates would melt away in the soil, but because it does not rain they form Chile's most important export.

The Chilean "Okanagan." Not all of Chile is desert. Her rich, central valley makes her, for her size, the greatest agricultural country in South America. This wonderful valley grows almost every farm product that we produce in North America. Wheat, barley, corn, oats, sugar, tobacco, grapes, and other fruits are raised as well as cattle and sheep. Yet this district is only a few miles from the desert. The "Westerlies" make the difference; maps 3 and 4 will explain why.

Santiago, the capital, is an inland city. Its port, Valparaiso, is the western terminus of the Trans-Andine railroad. Punta Arenas is of interest because it is the most southerly town in the world.

The three colonies. South American countries are independent states with the exception of the three Guianas, which belong to European Powers. The area of the three colonies is about half that of British Columbia; the population almost equals ours in number, but is composed largely of Indians, negroes, and East Indians.

British Guiana is much the largest of the three. Its chief product is sugar, in connection with which rum and molasses are also exported. Balata and bauxite are important. The former is a kind of gutta percha much used for belting; it is obtained from a tree. Bauxite is a mineral from which aluminium is secured.

Dutch Guiana produces sugar, cocoa, and coffee.

French Guiana, the smallest and least developed of the group, is used by France as a penal settlement.

SOUTH AMERICAN TRADE.

	Sells	to	Buys	from
Colombia.	Coffee, Bananas, Hides, Emeralds	United States. Great Britain.	Cotton goods, Foodstuffs	United States. Great Britain.

SOUTH AMERICAN TRADE—*continued.*

	Sells	to	Buys	from
Venezuela.	Coffee Cocoa Balata Sugar	United States. The Netherlands.	Cotton goods Machinery Metal goods Flour	United States. Great Britain. Germany.
Ecuador.	Cocoa Panama hats Vegetable ivory	United States. Italy. Spain.	Textiles Machinery Foodstuffs	United States. Great Britain.
Peru.	Cotton Sugar Copper	Great Britain. United States.	Textiles Foodstuffs Iron and steel goods	United States. Great Britain.
Bolivia.	Tin Copper Cocoa	Great Britain. United States. Chile.	Cotton goods Machinery Foodstuffs	United States. Great Britain.
Chile.	Nitrates Copper Iodine Wool	United States. Great Britain. Germany.	Textiles	United States. Great Britain.
Argentina.	Grains Meats Dairy products Linseed Hides Wool Quebracho	Great Britain. United States. Germany. France.	Manufactured articles of all kinds	Great Britain. United States. Germany.
Uruguay.	Meats Wool Hides	Great Britain. United States. Germany.	Coal Cotton and silk Sugar	United States. Great Britain. Germany.
Paraguay.	Yerba maté Quebracho Tobacco	Argentina. Uruguay. United States.	Textiles Foodstuffs Machinery	Argentina. Great Britain. United States.
Brazil.	Coffee Hides Cocoa Rubber	United States. France. The Netherlands. Germany.	Wheat Oil Coal Manufactures	United States. Great Britain. Argentina. Germany.
Canada.	Farm machinery Rubber goods Sewing machines Automobiles	Argentina.	Sugar Hides Quebracho Corn	British Guiana. Argentina. Peru.

PUZZLE QUESTIONS

1. What is the largest country in South America?
2. Where are the finest emeralds found?
3. What is the chief source of the world's platinum?

4. In what country are grapes extensively grown?
5. What is the largest city in the Southern Hemisphere?
6. Where is cocoa produced in largest quantities?
7. Along what river are alligators found?
8. Describe the garment called the poncho. In what country is it worn?
9. What country has its capital near great volcanoes?
10. Which is the cleanest city in South America?
11. Which city has the finest harbour?
12. Which state produces the most gold and silver?
13. In which country do beech and pine forests grow?
14. Which country does not touch the sea?
15. In which country were the railways built by British Engineers?
16. Which state mines saltpetre in great quantities?

SCRAMBLED WORDS

Arrange the letters in each of the following groups to make names as indicated (Map 27 in Atlas).

(*a*) Six capitals of countries:

raCacsa, toQui, divoMteone,
ioR ed ironaJe, Grogteowne.

(*b*) Four important rivers:

rogeN, caTotinns, zamAno, gaMladane.

(*c*) Three precious stones, each followed by the country in which it is produced:

damerel, loCbomai; miadnod, zarBil; bury, bamloCoi.

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

One-half of all the linseed oil mixed in paint comes from Argentina.

Few know that the United States of Colombia in South America far outstrips Russia in the mining of platinum.

The largest number and the finest quality of emeralds, one of the most valuable precious stones, come chiefly from Colombia in South America.

A steamship could sail forty thousand miles in the rivers of Brazil, which leads the world in navigable waterways.

Buenos Aires, with a population of over 2,300,000, is the largest city in the southern hemisphere.

Though India has the greatest number of cattle, Argentina exports the most.

A pitch lake in Trinidad furnishes the world with most of the asphalt used to pave streets.

Three out of every four balls of binder twine made from sisal hemp are the product of Mexican farms.

The little state of Honduras in Central America is the greatest exporter of bananas, and the island of Jamaica is second.

FIG. 138. HOW TO FIND THE AREA OF A CONTINENT

First count the number of squares wholly within the region. Then count the number of squares partly within the region. Divide the second number by two and add to it the first number, which gives the number of squares covered by the country. As each square measures ten thousand square miles, the area can be calculated. For example take Bolivia :

Number of squares wholly within Bolivia (those with crosses), 35. Number of squares partly within Bolivia (those with circles), 35. ∴ Area in squares, $35 + \frac{35}{2} = 52\frac{1}{2}$. Area in square miles is $10{,}000 \times 52\frac{1}{2} = 525{,}000$ square miles.

In this way find the area of Brazil, Peru, Colombia, Argentina and South America.

CHAPTER XIV

EUROPE

We live in the New World of America, but our ancestors came from the Old World, which comprises the continents of Eurasia and Africa. Most of the people who settled the Americas and Australia came from a small portion of that great land mass—from the part called Europe. This name is a very old one, and means darkness or land of the setting sun, while Asia means land of the rising sun. These names were evidently given by people living somewhere between the two, probably in Asia Minor or in Greece.

It is a remarkable thing that so many million people could emigrate from Europe and that there should be so many people still living there. How does Europe compare with our continent in size? In population?

	Area (sq. miles).	Population.
North America	8,500,000	150,000,000
South America	7,570,000	56,400,000
Europe	3,870,000	464,680,000
Asia	17,200,000	872,500,000
Africa	11,600,000	142,750,000
Australia	2,975,000	5,437,000

There are a number of reasons for Europe's great population. It has no large deserts such as we find in the continents of the New World, nearly all of its surface is good for farming, and it is the most suitable of all the continents for the easy transport of goods of all kinds. Above all, the climate of Europe is nearly everywhere suitable to the white man. For many centuries its people have led the world in intelligence, wealth, and civilization. The greatest scholars, the most celebrated artists, the most brilliant writers, the keenest thinkers—in fact most of the world's leaders during the last two thousand years have been nourished in this little, irregular continent.

Europe is a peninsula of peninsulas (Map 32). Great inlets of the sea stretch their kindly arms far into the land. The heart of the continent is

brought almost within sound of the sea, and every inland point benefits from the great ocean ships ready to carry goods to all parts of the world. Compare with North America, and decide how much of Europe is low-lying plain? Where are the main mountain ranges? Does their position influence the rainfall over the great plain of Europe? It is only in the district around the Caspian Sea that drought may occur and cause crop failures.

Things to do. On an outline map of Europe mark in the main highlands and compare with the highlands of North America. Fill in the names of the more important bays and peninsulas.

Europe differs from North America in another striking way. The following exercise will help you to see this. Estimate the latitude of the southernmost points of Spain, Italy, Greece, the Black and Caspian Seas. Find these latitudes on an outline map of North America, and draw the outline of southern Europe across your outline map of North America. Do the same for the northern points of Europe. Where do they fall in North America? What do you conclude from your map comparisons, as to the latitude of Europe? What cities of Europe are in the same latitude as Vancouver, Toronto, and Halifax? If you liked a mild climate, which city would you choose, Halifax, Bordeaux, or Venice?

Do this in your geography note-book. On a base line one half inch long, construct a rectangle four and a half inches in height; dividing it into half-inch squares. Let each square represent one million square miles. This rectangle will represent the area of North America. Draw similar rectangles for Europe and South America. On your rectangle of North America fill in fifteen dots, each dot representing ten million people. Mark the population of the other continents in the same way. Which continent is densely populated?

Count the countries of Europe. How many countries are there in North America, in South America? Why has Europe so many countries or national states? It will be difficult for you to answer this now, but keep it in mind; and when we have finished our study of Europe this question can be brought up and answered. Which one of the countries of Europe do we generally study first? How many continents are represented in your class-room? If any of your class-mates or their parents came from the British Isles, perhaps they could tell you at what sea-port they embarked and the name of the vessel which brought them to Canada. Let us go on a visit to these wonderful islands.

The British Isles.

We can buy a ticket via C.P.R. or C.N.R., the cost will be the same. Trace our route on a railway folder. Shall we leave from Quebec, St. John, or Halifax? Has the season of the year anything to do with our decision? How many miles have we come already? It is between 2880 and 2630 miles from Quebec to Liverpool, according to the route we take, and it is 2485 miles from Halifax to Liverpool. Some ships dock at Southampton instead of Liverpool. I am sure we should all wish to take train for London soon after our arrival at either port.

We are now in the largest city of all Eurasia. It has seven million inhabitants, nearly as many as are found in the whole of Canada. It is an

FIG. 139. THE HOUSES OF PARLIAMENT SEEN FROM THE RIVER THAMES

Courtesy of Cotton Spinners' Association, England.

FIG. 140. CARDING ROOM IN A COTTON FACTORY AT OLDHAM, ENGLAND

old, old city. Some of the streets are quite narrow and crooked. It is very easy to get lost. The traffic is dense on every street. There are wagons and drays piled high with goods from everywhere. There are auto vans and buses, and even underground tubes to carry people swiftly from one part of the city to another. Everywhere there are people, and everyone seems to be going somewhere—but where?

London is the capital of Great Britain. It is situated on both sides of the Thames River about thirty miles from its mouth, where the firm land made it possible to throw a bridge across the stream in olden days. Now many great bridges span the river. Below the bridges, toward the sea, are the great docks. There are miles and miles of these, where a ship may unload her goods into warehouses. There we may see ivory and oil from Africa, rubber from Malaya, cotton and sugar from Egypt, petroleum from Mexico and Persia, tea and spices from India, wheat, wool, and hides from South America and Australia, and paper and wheat from Canada. These are just a few things we would find. It would not be difficult to name many more. London is the world's great distributing centre. Hundreds of articles are brought to London by the shipload. They are then sold to other people in any quantity desired.

The Parliament Buildings face the river and house the oldest parliament in the world. Not far away are St. Paul's Cathedral, Westminster Abbey, where the kings and queens of England have been crowned, and the Tower.

There are many reasons why London has grown to be such a great city. It is the centre of many trade routes. To the north and east there is trade with Scandinavia, and through the Baltic with Finland, Russia, and Poland. To the south the trade routes lead to Germany and France. By the Channel we may go to Spain and the Mediterranean, to Africa and to North and South America.

But greatest of all have been the industry, the thrift, and the sterling business ability of its people. They have made a name for themselves in honest dealing, and that always influences trade. London has great rivals in Paris and Berlin, but these two continental capitals are farther inland, no large ships can reach them, and they have been compelled to build large trading harbours at a distance, as at Havre and Hamburg.

The climate of the British Isles is stimulating. These islands lie in the path of the stormy westerlies. There are days of bright, fine weather, followed by storm and rain. The air is moist and carries the tang of the salt ocean. We have found that climate has a great influence on men and on the amount of energy each one has at his command. It is probable that large portions of the Mediterranean sea-coasts will never support a vigorous

industrial population. We go to the Riviera to rest and relax. Extremes of heat or cold are as harmful to steady, productive labour as is a monotony of heat. The climate of Great Britain being *insular*, is not subject to such extremes. See Maps **35** and **36**, Atlas.

Compare with Maps **10** and **11** and note the differences in the climate of the New England states, St. Lawrence Valley, Labrador, Newfoundland, and Greenland. Can you account for the mild climate of the British Isles?

Agriculture. For centuries past the plains of southern England have been noted for their production of grain. On Map **39** find the low, fertile lands and compare with Map **40**. The average production of wheat in our prairie provinces is about twenty-two bushels per acre, in England it is thirty bushels. The pasture lands grow excellent grass, and horses, cattle, and sheep thrive on these lands. The result is that special breeds have been developed. These are much sought after by people of other countries, and the farmers of Great Britain and Ireland sell thousands of fine animals each year for breeding purposes. To-day the population has grown so large that the people of England do not attempt to grow all their own food, but find it cheaper to import by sea much of their grain, beef, butter, eggs, and bacon. From what countries would these supplies probably come?

By reference to Map **39** you will see that the main mountain areas of Great Britain are in Scotland and Wales, while one ridge, the Pennine Chain, extends southwards from the Tyne to the Trent. These mountains are high enough to intercept the westerlies and to cause a heavy rainfall on their western flanks, while their eastern slopes are much drier. Among the mountain ridges are large moorlands covered with short grass. These are well adapted for the grazing of sheep. From Roman times down to the present day Great Britain has excelled in the raising of sheep and in the production of fine wool. For many centuries every little cottage had its spinning-wheel and loom, where the people spun the yarn and wove the cloth when there was a lull in the farm-work. Eventually men built large mills beside the waterfalls of the Yorkshire dales and made the falling water do the work of many hands. In this way Yorkshire early became a centre of woollen manufacturing. When the steam engine was invented, larger factories were built near the coalfields, and Yorkshire continued to be the leading woollen manufacturing centre in England. There were men at hand who already knew how to spin and weave by machinery, and the Pennine moorlands provided a handy source of supply of the raw wool. To-day the woollen mills of Yorkshire not only use the local supply, but also buy wool from far-away Australia, Argentina, and South Africa.

Dorman, Long Co., Ltd.

FIG. 141. AN ENGLISH COLLIERY

In the centre is the elevator by which the coal is raised from the mine thousands of feet below

Chapman, Swansea.

FIG. 142. THE SHEET MILLS OF MESSRS. BALDWINS' STEELWORKS IN SOUTH WALES

FIG. 143. A SHIPYARD AT BELFAST

Leeds is the centre of this industry, while near by are Bradford, Halifax, Huddersfield, and Wakefield.

Cotton. In a similar way there grew up near the port of Liverpool the great cotton-spinning industry which centres in Manchester. Conveniently near are the Lancashire coalfields. In addition it has been found that the air must be damp if the fine cotton thread is to be spun without breaking. The heavy rainfall on the west of England provides the right amount of moisture in the air. Liverpool, at the mouth of the Mersey, is the great shipping centre for the whole district. It is connected with Manchester by a ship canal, thirty-six miles in length, and large ocean vessels may now reach the very heart of the cotton-manufacturing district. Bolton, Bury, and Oldham are other large factory towns. The raw cotton comes from the United States, Egypt, and Asia. Coal, climate, and skilled workmen make the Lancashire district famous for its manufactured cotton. It has been said that the looms of South Lancashire can supply sufficient cotton fabric to clothe five hundred million people.

Life in the great mill towns is hard and sometimes drab and dreary. The soot from the chimneys darkens the day and corrodes the buildings. The mills have a weather-beaten and shabby appearance. The homes of the workmen are monotonous in their sameness. They line the streets, row after row, of brick and stone and of the same pattern. Heavily-loaded trucks pound their way over the rough cobbles of the narrow streets. The children scamper over the flagstones of the sidewalk on their way to a great brick school. Vacant lots, tangled undergrowth, and wild-bird nests are not in the picture. The more it rains the more dismal the outlook, but in this respect the woollen towns have a better location.

Iron and steel. England has been wonderfully fortunate that her coalfields had beds of iron ore near by. The best known of these is the central Staffordshire coalfield, with its great city of Birmingham. This is called the "Black Country." Here are blast furnaces, rolling-mills, and factories which manufacture tools and machinery of every kind. Since Birmingham is inland, the people have specialized in the manufacture of steam engines and motor cars, which can be sent to their market under their own power. On the other hand, small articles which require much skill in their production are better able to stand the freight charges than bulky, heavy articles. Hence we find the Birmingham district producing nuts, bolts, locks, screws, nails, and chains. Sheffield has grown up near large beds of fine sandstone, out of which grindstones were made. So we find the Sheffield factories specializing in the making of cutlery and fine cutting tools of all kinds. Heavy iron goods, such as rails, structural steel, and plates, are made

in sea-coast cities as at Newcastle, Middlesbrough, Cardiff, and Swansea.

Englishmen were the first to invent and use machinery for spinning and weaving; they were the first to use coke in the smelting of iron ore, and the first to use the steam engine. This start gave them an advantage over other people, and during the nineteenth century England led the world in the production of iron and steel. Since 1900, however, Germany and the United States have become strenuous rivals, and the latter country now leads by a wide margin.

The Potteries. When you go home turn over a plate or saucer and read the legend or stamp you will find there. That tells you who made that particular piece of china-ware. How many different "makes" can your class find and list? There are some very well-known firms who have been making china-ware in England for several hundred years, and the towns where this industry is carried on are known as pottery towns.

China is made from clay. Coal is needed for the baking ovens and skilled workmen are required to make the designs and heat the models to just the right temperature. Stoke-on-Trent is a centre of this industry. (See Map 43.) Derby and Worcester are also noted for their porcelain manufactures. The beds of clay are near the Staffordshire coal-mines, and a canal connects Stoke with the Mersey River and Liverpool. Some of the finer clays are now brought by barge from Bristol. The finished product is so valuable that it is sent by rail to many of the large sea-ports for sale overseas.

Coal. From what has already been told you regarding the growth of certain great industries in Britain you may have noticed that one factor recurs time and again. Each centre of industrial activity is near a coalfield. It is only within the last two hundred years that coal has been used to any extent. Before that time, if people wished to smelt ores, charcoal was used, and at one time the people of Britain were afraid that their forests would soon be gone, so great was the demand for charcoal. When it was discovered that coke made from coal could be used to smelt iron, thousands of charcoal-burners were thrown out of work. Coal-pits were opened in many places, the steam engine was invented to pump out the mines, and those centres of manufacture which lay near coalfields began to forge ahead very rapidly.

Nowhere else in Europe is coal so advantageously placed as in Great Britain. Many of the fields lie near the sea, while others are found inland. Thus the coal is easily and cheaply transported by vessels to all the main sea-ports, or by short rail-haul to near-by factories. In Britain coal is king and has helped to give England her leadership as a great trading and manufacturing nation.

Underground.

FIG. 144. A BUSY SCENE IN THE HEART OF LONDON

Do you see any street cars in this photograph? How many buses can you count? How do the people reach the cars? Are many riding on top? Does traffic keep to the left or to the right? Name three cities where the reverse is true. Find a safety isle in the middle of the street. What is its use?

Fig. 145. In the Highlands of Scotland

[illegible] growing on the hills? What? Was the photograph taken on a fine day? How do you know?

The coal-beds of southern Wales contain the finest steam coal in the world. Like Canadian No. 1 hard wheat, Welsh steam coal is a world standard. It is so hard that it will burn with a bright flame, with little smoke, and give an intense heat. Some of the mines run out under the sea; others have been worked for over a century and have been abandoned, but new mines have been opened and the supply has been well maintained.

You have probably been thinking of conditions in Canada. Have we coal at tide water? Is there coal in the lowlands of the St. Lawrence? Where do the people of Quebec and Ontario get their coal? If the St. Lawrence were open all winter would the miners at Cape Breton benefit? Where are the large industrial establishments of British Columbia? What is meant by *White Coal*? What other competitor has coal?

Shipbuilding. About sixty years ago men began to build ships made of iron and steel. Britain at once took the lead in this new industry, and has maintained her leadership up to the present. One reason is that her coal-beds come down to tide-water. At Newcastle-on-Tyne the loaded coal cars can run down an incline to the furnaces by the waterside, where the steel plates are made. At the same time by their weight the loaded cars haul up the empties. All this saves expense, and Newcastle is a noted ship-building centre. Ships are also built at Glasgow on the Clyde, near the Lanarkshire coalfield. You will find the Clyde estuary lined with shipyards for twenty miles, and over one hundred thousand men employed in that one industry.

Some of Britain's iron ore deposits have been exhausted, but the demand for ore has been so great that now large quantities are imported from Sweden and from Spain. These countries need coal, so that it is profitable to take away a load of coal and bring home a load of iron ore. It has been found cheaper to bring the iron ore to the coalfields where the blast furnaces had already been built, than to try to ship coal to the iron ore, build furnaces, and move the skilled workmen into new homes far away. Once an industry has become established in a place it tends to remain even after the immediate or local supply of raw material has become exhausted.

In south-western England tin mines have been worked from the time of the Romans. The smelting of the ore was gradually concentrated at Swansea beside the coalfield of South Wales. But the local supply of tin proved inadequate, and to-day Swansea imports tin, zinc, and copper from far-away Chile, Malaya, and from the nearer mines of Portugal and Spain. Much of the tin used in our salmon canneries comes from Swansea. Bristol is the third great sea-port of south-western England. Its situation at the head of deep-sea navigation on the Avon River has long given this port an enviable position. A short, low route leads across to the Thames valley

and to London. Bristol has a large trade with Ireland and with South America.

Fishing. The seas have always appealed to the English. Great Britain is an island. You must cross the sea to reach it; the Saxons came in their long-boats and conquered it. They were in turn overrun by the Danes or Viking sea-rovers. The love of the sea is in the blood. No part of Britain is more than sixty miles from the sea. The rivers are slow, deep, and tidal, so that vessels may ascend in safety. In addition the British Isles stand on a platform surrounded by shallow waters (Map 39).

These shallow, encircling waters are one of the world's great fishing-grounds. There is hardly a tiny hamlet anywhere along the whole coast of Britain and Ireland but has its fishing smacks and its hardy fisher-folk. To an industrial people, who must buy their food, often importing it from far-distant places, the nearness of the fishing-grounds has been a boon and a blessing. The fisherman must brave many dangers in reaping the harvest of the sea. Winds blow and tides contend over this whole expanse of Irish Sea, English Channel, and North Sea, the greatest training-ground for seamen that the world has ever known.

Herring are caught by thousands of tons. They are sold fresh in the markets, or smoked and sold as kippers, or salted down in kegs to be sold as occasion demands. Cod, haddock, flounders, and plaice are also caught, but no one of these equals the herring in quantity.

This is an age of steam, of iron, of steel. Capital is secured and work is carried on upon a large scale. To-day the picturesque sailing smack or wooden fishing-lugger is gradually giving place to the steam trawler and its otter boards, and to the steam drifter with its mile-long gill-net.

Grimsby is the greatest of all the fishing ports. Aberdeen, Hull, and Great Yarmouth also deal largely in fish. There are at least one hundred smaller ports where fishermen land their catch. Many thousand men are employed in this industry, and it is not difficult to see where English sailors get their training and why vessels of England sail the seven seas carrying some part of the trade of every country.

Scotland

What striking difference is there between the far-northern part of Great Britain and the southern part? (Map 39.) Why should people from Scotland feel at home in British Columbia? Scotland consists of three parts—the northern *Highlands*, the *Lowlands*, and the southern *Uplands*, which long formed a natural barrier to the advance of the English. The people live mostly in the Lowland region from the Clyde to the Forth.

Photo by R. J. Welch.

FIG. 146. GLENMORE LINEN BLEACH GREEN, LARGEST IN THE WORLD
Half a mile square of linen bleaching.

Photo by R. J. Welch.

FIG. 147.
Putting the flax, after pulling (flax is not cut) into the dam for retting and covering it with stones to keep it down.

Planned by P. H. Tacon, B.A.

FIG. 148. A PICTURE PUZZLE OF THE MANUFACTURES OF GREAT BRITAIN AND IRELAND

Each manufactured article is represented either by a picture of the product or a sign with the name on it. But the letters in the names have been put out of order. On, or near, each object is the initial letter, or letters, of the city in which it is made. The full names of the cities are given below. The pupil is to write out a list of the productions and put after each the name of the city, or cities, in which it is made.

B., Birmingham; Bo., Bolton; Be., Belfast; Br., Bristol; Co., Coventry; De., Derby; D., Dudley; Du., Dundee; Dub., Dublin; E., Edinburgh; Gl., Glasgow; Gr., Grimsby; H., Huddersfield; Ha., Halifax; K., Kirkcaldy; Ki., Kidderminster; L., Leeds; Le., Leicester; M., Middlesbrough; N., Newcastle; O., Oldham; P., Paisley; Sh., Sheffield; Sw., Swansea; W., Warrington; Wa., Walsall; Wo., Worcester.

The Highlands consist of hard granite rocks cut into deep, narrow valleys by rivers and streams. On the western side the mountains come down into the sea and form long, narrow inlets. This coast resembles the coast of British Columbia. There is little soil for farming; trees grow in the valleys, while heather covers the higher slopes up to the bare rock ridges of the summits.

There are few roads through the Highlands, it does not pay to build them. Yet, wherever there are small patches of land in the valleys, you will find the stone houses of the crofter. Small fields of oats and potatoes provide him with oat cakes, porridge, and vegetables, and he can have milk, butter, and eggs from his cow and a few hens. Up the glens and over the hills the crofter herds his sheep. His wife spins yarn from the wool and weaves it into cloth. The sheep are sold; they are the crofter's chief "money crop." Such a land cannot support a large population, and very often the sons and daughters must go down to the Lowlands to find work. Many thousands have emigrated to Canada. The hard life in the mountains has made a strong and virile race, most of whom are successful here.

Large areas of the Highlands have been purchased by wealthy men and turned into game preserves. The land has been fenced, game-birds and deer have been introduced and guarded by keepers. Once or twice a year for a few weeks the landlord and his friends arrive for a shoot. It is said that more of Scotland is now given over to deer forests than to cultivation.

In the summer-time large numbers of tourists go to the Highlands to enjoy the wonderful scenery and the cool, invigorating climate. To-day Scotland turns many an honest penny in selling her scenery.

Along the east coast there is a narrow plain, with good soil, a contented farming population, and fair-sized towns. The fishing is good, barley will ripen, and there are large distilleries. Aberdeen is a large city. It has long been noted for its granite quarries, and, of late years, for its production of burlap and bags from jute fibre imported from India. Its herring fisheries are important, and many people are employed in the manufacture of woollen cloth from the wool of the Highland sheep.

The Lowlands comprise about one-tenth of the area of Scotland, but contain over five-sixths of the population. Here are the best farm-lands, a mild climate, and an easy route from the Firth of Forth on the east to the Firth of Clyde on the west. Coal areas are found in both river valleys and iron mines lie adjacent to the coal. This has led to manufacturing. Edinburgh is the oldest city, the capital, a seat of learning, and is noted for its printing of books and making of maps. At Kirkcaldy, oil-cloth and linoleum are made, while Dundee imports flax from Russia and produces linen.

Glasgow is the great industrial city of Scotland. Owing to its wet climate much cotton is imported and woven in Glasgow, while Paisley manufactures more cotton thread than any other city. Shipyards line the Clyde for miles. Coal, iron, and limestone near at hand furnish the raw materials. Marine engines and boilers are also made for the vessels which are built there. Glasgow is the greatest ship-building centre in the world, and is the second city in size in Great Britain.

Galashiels, Hawick, Peebles, and Selkirk in the valley of the Tweed manufacture woollen goods from the wool of the sheep which graze the flanks of the Cheviot Hills. The river has given its name to this Scotch fabric, which now enjoys a world-wide reputation.

Ireland is a little larger than Vancouver Island, and occupies a similar position in respect to the larger land mass of Great Britain. By reference to Maps 35, 36, and 37, you will see that the rainfall is heavy in the west and somewhat less in the central and eastern sections. On the whole there is less range of temperature than in Britain, and Ireland may be said to have an even more *insular* climate.

The mountains lie to the south, west, and north, with a low central plain intervening. The mountains are more like hills, and are broken into groups with low passes between them. Central Ireland is a low, flat plain with many wet, moss-filled hollows. In fact one-third of Ireland is covered by bogs, from which peat is cut and dried for fuel.

The mild climate and the heavy rainfall produce rich pasture-lands, and Ireland has long been known as the *Emerald Isle*. Dairying is the important industry, and the larger part of the people who live in Ireland are engaged in farming of some kind. (Map 40.) Butter, eggs, bacon, and live-stock are exported in large quantities to the English market through the ports of Dublin, Waterford, and Cork. Dublin is the capital of southern Ireland, which is now known as the Irish Free State. Roads lead out from Dublin to south, west, and north, while its educational institutions make it a seat of learning as well as a large commercial centre.

Northern Ireland, or Ulster, is governed from Belfast. It is largely agricultural, with dairy-farming the leading occupation. In the district near Belfast large areas are devoted to the growing of flax. The district has become noted for the making of fine linen. Flax fibre is also imported from Russia since the factories have outgrown the local product. Oats are an important grain crop throughout all Ireland, but in late years much barley has been grown to supply the demands of the distilleries and breweries at Belfast and Dublin.

Belfast is but little over one hundred miles from the Clyde coalfields.

Coal and iron ore can be readily imported by sea, with the result that there has grown up at Belfast one of the largest ship-building plants in the Empire. This has led in turn to many allied industries, so that Belfast has become the leading industrial centre of Ireland. It is due to the lack of coal and iron that Ireland is mainly agricultural. The population is fairly well spread over the land, and there are but two large cities. Cork stands third, with a population of over fifty thousand. Londonderry, Limerick, and Waterford have each over twenty thousand. These are all sea-ports and thrive as export centres to England and as import and distributing centres for the adjacent farming areas.

Problems to solve:—

From what you have read can you account for the pre-eminence of Great Britain in ship-building?

Although the British Isles have fertile lands and a fine yield per acre of grain, large quantities of foodstuffs are imported. Why should this be so?

What natural resource has determined the location of England's great industrial centres?

What reasons can you give for the size of the cotton manufacturing industry in and around Manchester?

In what way is it an advantage to have shallow seas surrounding the British Isles?

Why is London not at the mouth of the Thames River?

From Merry England to Sunny France. If we are in a hurry we can go to the *Croydon* Aerodrome near London and take a regular passenger plane to Le Bourget Field near Paris. But if we go the way most people go we shall take a train to Dover, the boat to Calais, and a train to Paris. The Strait of Dover is only twenty-two miles wide, and a fast steamer can make the crossing in about one hour. Strong tides and winds often make the trip a stormy one, and many a wan-looking passenger lands at Calais or Boulogne. Note the other possible routes. Why are there so many?

The country to the south of the English Channel resembles the land of southern England. It is part of a great plain known as the lowland plain of Europe. On Map 33 note the position of the highlands far to the south and east. Find the main rivers which drain to the Atlantic and north to the seas. These rivers flow through wide, flat valleys, and have tidal estuaries which provide good harbours. They are navigable and flow slowly, and canals have been built connecting many of them. A network of railways covers this important plain, and everywhere there is transportation by rail and water.

The lands of this plain are so valuable that for hundreds of years nations have fought for the possession of even tiny portions of them. Try to find the names of the countries which own portions of this lowland plain. Great Britain has been under one Central Government since 1707. There have been no wars in Britain since that time, no invasions of her fertile lands, and no destruction of her cities or fields by armies or warring Powers, except by aeroplane during the last war. Has this been an advantage? The same cannot be said of any part of the fertile lands of Europe. Has this been a disadvantage to the people living on these plains and trying to develop their resources? Does this explain why England has forged ahead as a great commercial nation?

The land of France. On the western end of the lowland plain, between

FIG. 149. PARIS AS THE CENTRE OF ROADS, RAILROADS AND WATERWAYS

the Rhine and the sea, there has grown up a nation of thirty-nine million people who speak the same language and who obey the same laws. For many centuries the people of France were our rivals in trade and in colonization. We had many long and bitter struggles with them, but for the last hundred years we have learned to get along on friendly terms with our neighbour across the Channel. Now that the League of Nations has been formed we hope there will be no more wars in Europe or in any other continent.

France has an enviable position in Europe. In the south the Rhone–Saone valleys provide an easy highway to the Mediterranean and the East. To the west, France faces the Atlantic, with the two river valleys of the Loire and the Garonne leading down to the Bay of Biscay. To the north, the Seine and the Somme lead to the English Channel. Railways have been built around the Pyrenees into Spain, and by passes through the

Photo by D. McLeish.

FIG. 150. IN THE HEART OF PARIS

The foreground shows gargoyles on the turrets of *Notre Dame de Paris* overlooking the Seine below.

Photo by D. McLeish.

FIG. 151. A CANAL IN FRANCE

One of the most vital means of transport in olden times, which is largely superseded nowadays by road and railway.

Photo by K. L. M.

FIG. 152. POLDERS IN THE NETHERLANDS

Polders are pieces of low-lying land reclaimed from sea or river. State three ways in which you might recognize this as a Dutch scene.

Photo by D. McLeish.

FIG. 153. A FIELD IN FLANDERS

This country seems as flat as our own prairies, but farming is quite different. How many differences can you find by examining the picture?

mountains into Italy and Switzerland (Fig. 149). Because of these natural advantages, and through the industry and thrift of her people, France has long been one of the most important of the European countries.

Maps 34 and 35 show the climate of France. How does the lowland region compare with southern England in temperature and in rainfall? Has the position of the mountains anything to do with the even distribution of the rain? In what way does the climate of southern France and the Rhone valley differ from that of northern France and the lowland plain?

Over half the population of France is engaged in farming. Wheat and oats are a staple crop in the fertile soils of the Garonne, the Loire, and the Seine valleys, and in the Flanders district toward Belgium. The people live in small villages and go out to their fields to work. That is quite different from the way we farm in Canada, where the houses are sometimes half a mile apart. In France we pass from one village to another along wide, paved roads lined on either side with tall poplar trees. Between the villages the cultivated fields stretch to the far horizon. Near Paris there are many thousands of acres devoted to truck-farming, to supply the local market which the city-dwellers provide. To the north of Paris we may see large areas devoted to sugar-beets, with here and there the tall stack of the beet factory towering into the sky. Near the sluggish streams are fields blue with flax, while still other fields are in rich green grass for pasture.

East of Paris the ground gradually rises to the hills of the Champagne country and beyond to the Vosges mountains which border the Rhine. In this district the hillsides are covered with vineyards, and much wine is made from the grapes. Wine is one of the important exports of France. Vineyards are also found in the Garonne valley, on the sides of the Côte d'Or between Dijon and Lyons and in the Rhone valley south to the Mediterranean.

The Rhone valley is much warmer and drier than the rest of France. On the sunny slopes to the Mediterranean the people grow mulberry-trees for silkworm culture, and Lyons has long been a centre for the manufacture of silk. Just to the east of the Rhone delta is the great seaport of southern France on the Mediterranean—Marseilles. This city was built in the days of the Romans on the side of a bay with firm ground, and where a current of water carries the Rhone silt to the westward. The marshlands at the mouth of the Rhone were not suitable for heavy stone buildings, and the silt would soon fill up any dredged-out harbour. Marseilles trades with the Mediterranean lands, with northern Africa, with the Far East by the Suez

Canal, and by the Straits of Gibraltar with equatorial Africa and South America. The water-front is lined with docks where ships from a hundred ports land their cargoes. The warehouses are redolent of spices, coffee, tea, and rubber. There is ivory and palm oil from Africa, raw silk from Asia, and dye-woods from the Amazon. Olive-oil factories and soap factories all help to make Marseilles one of the busiest of Mediterranean ports.

Paris. There is a saying that all roads lead to Paris. This is just another way of stating the importance of the capital and largest city of France. The geographical location of Paris is the reason for its size and influence. France is a compact country, and its four large river valleys lead to a common centre, *Paris*. Railways radiate in every direction from Paris, like spokes from the hub of a wheel. Anyone visiting Europe (Fig. 149) goes to Paris. It is the largest, the gayest, and probably the most attractive city on the continent. There are beautiful gardens, palaces, and churches. The Eiffel Tower is one of the wonders of the world. You will not find large factories and smoke and grime, but you will see many small factories and shops where people produce those artistic things for which France is noted. Beautiful clothes and wonderful perfumes are made there. Other artisans are busily making hand-bags and purses from leather; there are jewellers who work out designs in gold, silver, and precious stones. In fact, almost everything that requires skill and work and beauty in design is made in Paris.

Other industries. France cannot compare with Britain in the number, size, or favourable position of her coalfields. That is the chief reason why France has not been able to keep pace in the race for trade in foreign lands. There are several small coalfields in the central plateau of France, and St. Etienne has become an important centre for the making of ribbon. In Lorraine there are the largest iron mines on the continent. But the coal in the Saar valley does not coke well, and the coke has to be brought either from the coal measures near Lille or imported from Germany. Nancy is the centre of this district, and there you will see blast-furnaces and rolling-mills turning out heavy plates, girders, and rails. Since these mills are inland, the manufacturers find it hard to compete with the English furnaces built at tide-water.

Another important coalfield is in northern France near Belgium. These coal measures underlie a flat, fertile, well-watered plain, and it is quite common to see tall coal tipples rising from the midst of well-cultivated fields. This coal provides power for the huge sugar-beet factories and for the textile mills in the towns. Lille is the centre of this industry. Raw cotton

is brought up the Seine to Rouen, and this old Norman town now boasts of its great cotton mills.

Something to do. Draw a large map of France, marking in the highlands, rivers, and main roads. On these highways of trade and commerce locate the following cities: —

1. Marseilles, Lyons, Dijon, Paris, Rouen.
2. Paris, Orleans, Tours, Poitiers, Bordeaux, Bayonne.
3. Bordeaux, Toulouse, Carcassonne, Narbonne, Nîmes, Marseilles.
4. Nantes, Tours, Orleans, Paris.
5. Calais, Lille, Amiens, Paris.

Three little countries in the Lowlands. The great river of the lowland plain is the Rhine. It has been called the Main Street of Europe. Going up the Rhine from the North Sea easy routes lead westward into France by the valley of the Meuse and eastward into Germany by the Main and the Neckar. Whoever controls the mouth of the Rhine is in a superior position for trade and commerce by sea with the rest of the world and by river valley with a large part of the most fertile portion of Europe. This was even more of an advantage in the days before the use of the steam engine and railways. And so there grew up around the mouths of the Scheldt and the Rhine the strong and wealthy trading nations of Belgium and Holland, with their great cities of Antwerp, Rotterdam, and Amsterdam.

During the sixteenth century Antwerp was the greatest of all the trading cities which face the North Sea. But the Dutch got control of the mouth of the Scheldt and placed heavy tolls upon the ships going up to Antwerp. This ruined the trade of that proud city, and of Bruges and Ghent as well. They became known as the Dead Cities of Flanders. The Dutch people early became England's rival for the trade with the Indies, and during the seventeenth century there were times when England was hard pressed by the energetic traders from Holland.

Rotterdam and Amsterdam have become great cities. From the Dutch colonies the ships bring tobacco, coffee, cinchona bark, spices, sugar, and cocoa to the river wharves of Rotterdam. Many steamship lines call at Amsterdam, and there are large warehouses where supplies of all kinds are stored for the use of the people of Holland. Amsterdam is the commercial capital of Holland, while The Hague is the political capital. Amsterdam is the centre of the world's diamond trade. The diamonds may be mined in Guiana, South Africa, or India, but they are brought to Amsterdam to be cut and polished into the sparkling gems of commerce. There is a diamond exchange where the members buy and sell diamonds every day, just as dealers in Winnipeg buy and sell wheat.

The land of dykes and windmills. The silt brought down by the Rhine has been building up a low, marshy coast for thousands of years. The climate is cool and there is much rain. Grass grows luxuriantly in the damp bottom lands. There the energetic Dutch people have worked and delved to reclaim these rich *polders* from the sea (Fig. 152). Dykes have been built not only along the seacoast, but along the river-banks as well. Canals have been dug, and the windmills pump the water from ditch to canal until large steam- or electrically-driven pumps lift it finally into the river and so to the sea. Everywhere the land is flat and wonderfully fertile. Beyond the cities lie the small farms, where the cattle feed in the damp polders. Part of Belgium is low land, barely above sea-level; nearly all of Holland is low, and some of it is below river- and sea-level. Butter and cheese are produced and exported in great quantities. There is a strong local demand in the large sea-port cities, but the larger amount is exported to northern France, to London, and up the Rhine to the Ruhr.

Oats, vegetables, and sugar-beets are also staple products from those moist lands which are too wet for wheat. Rye is grown on the sandy hills of eastern Holland, where the soil is comparatively dry and poor.

The Dutch farmers are noted to-day the world over for the production of bulbs. The deep sandy-loam soils near the Zuider Zee seem to be specially suited for this culture, and the Dutch have learned during the last three hundred years how to excel in this difficult kind of horticulture. Plots of hyacinths, tulips, and daffodils in full bloom make wonderful splashes of vivid colour in the fields of vegetables, grain, and green pasture. Holland sends bulbs to every land.

Belgium. The northern part of Belgium is low and flat like Holland. Southern Belgium slopes up to the hills of Luxembourg and to the forest-covered plateau of the Ardennes. Belgium is the most densely populated area in Europe, and although smaller in area than Holland, has a larger population. On the lowlands near the Lys River large sections are devoted to the growing of flax, and the old towns of Ghent and Bruges are reviving once again with the manufacture of linen. Many of the Belgian women who live on the small farms are skilled in the making of lace. This spare-time occupation brings in a welcome addition to the family exchequer.

Brussels is the centre of the lace industry. It is also the capital and the largest city. It is well situated near the centre of the country between the lowlands of the north and the upland country of the south.

The upland region is underlaid with coal-beds. Deposits of copper,

lead, and zinc are found near by, and there are iron-ore beds in Luxembourg. Liège and Namur are the important centres of this rich mining area. They are located in the valley of the Meuse, which provides an east–west highway from France to Germany. This may be called the Black Country of Belgium. There are great factories, furnaces, and rolling-mills. The farmers on the lowlands and the fishermen by the sea supply the factory workers with cheap food, which is a great advantage where competition in trade is so keen. For some time southern Belgium has excelled in the production of glass. The finer types of optical glass are made and the six-foot lens for the telescope in the observatory on Little Saanich Mountain, near Victoria, B.C., was cast in Belgium.

Coal-mining employs many people, and thousands of tons of coal are sold each month to the people of Holland, France, and Switzerland. At the same time the textile factories in Brussels, Ghent, Bruges, and Antwerp receive cheap coal from these mines.

Some comparisons. While a large part of Belgium is an upland deeply cut by old river valleys, the large coal measures provide power for factories, and the population exceeds that of Holland, whose arable lands are much greater in area and in productivity.

Belgium has but forty miles of coast-line and but one large sea-port. Holland has several hundred miles of coast, two large sea-ports, and control of the Rhine mouths. Yet the industry of the Belgian people is such that they are able to compete in the world's markets with the great nations of Europe.

Just as Amsterdam has become the world's diamond market, so has Antwerp become the world's ivory market, drawing its supplies largely from the Belgian Congo in Africa.

Things to do. Make a list of the Dutch colonies and the Belgian colonies. Do these help the home countries in manufacturing?

The fields of Flanders and of Belgium have been called the Battleground of Europe. Can you find an explanation of this phrase?

In what way have the dykes and canals of the Low Countries been of advantage to the inhabitants in time of war?

Why did large cities grow up at the mouths of the Scheldt and the Rhine?

How does the following table support statements made in the text?

	Area (sq. m.).	Population.	Productions.
Belgium . .	11,373	7,600,000	Iron, steel, zinc, lead 8,200,000 tons.
Holland . .	13,212	7,000,000	Butter, cheese, sugar $200,000,000.
Denmark . .	17,149	3,400,000	Butter, eggs, bacon $300,000,000.

Denmark. The peninsula of Jutland has many features in common with the low countries of Holland and Belgium. Since Denmark guards the entrance to the Baltic Sea, it has such great strategic importance that the nations of Europe have jealously guarded its independence. For many centuries its sandy soil produced small crops, while its fishermen gained a fair livelihood from the sea. Danish vessels manned by Danish sailors sought to carry the trade of other lands. Copenhagen grew to be a great port on the road south from Scandinavia and on the route from the Baltic to the North Sea.

But the industrial towns across the North Sea from Newcastle to London were calling for food. This led to co-operative farming in Denmark, and to-day the Danish farming societies are models for the world. By means of scientific agriculture, by studying climate, soil, and crop rotation, and by intelligent marketing, Denmark produces dairy products second to none. Danish butter competes in Britain with that from the Low Countries, France, and Ireland. Danish bacon has set a standard like Canadian No. 1 hard wheat. Danish eggs are graded and sold at a premium. The people of Denmark have provided a lesson to other countries in industry and in mutual help. There is no coal and little manufacturing; but the people are prosperous and contented. The farms of Denmark are really small factories. The cattle feed in the pastures, thousands of tons of oil-cake and grain are imported in order to make a balanced ration; the milk is skimmed and the fats are turned into butter, while the skim milk is fed to pigs and poultry, from which bacon and eggs are produced. The dairy cow is the basis of the whole industry, and these number about two million, eight hundred thousand. Records are kept of the milk and butter produced by each cow, and when the record falls below a certain standard that animal is withdrawn from the herd, fattened, and killed for beef. It is only by applying the facts of science to dairying that the Danes are able to make their sandy soil support their people.

Does this make you think of similar conditions in the lowlands of the St. Lawrence? Which district has the better soil, the better climate? Which country is close to a great market?

Germany extends from the Alps to the sea. It is therefore rugged and mountainous in the south, but slopes northward to rolling uplands, and finally down to the lowlands which border the northern seas. Four rivers drain this northern slope, while a fifth drains easterly to the Black Sea. Can you find them on Map 33?

The lowlands of Germany are an extension of the plain of northern France, Belgium, and Holland. However, as we go east from the Rhine

Photo by D. McLeish.

FIG. 154. THE RHINE AT COLOGNE

On the far bank of the river are seen the majestic spires of Cologne Cathedral, one of the finest specimens of Gothic architecture in Europe; the cathedral was begun in the year 1248 and was not finished until 1880.

FIG. 155. THE SHORTEST PEOPLE OF EUROPE: THE LAPLANDERS

Describe their house. Has it any windows? Of what is it made? Describe the appearance of the people.

By courtesy of "World's Markets."

FIG. 156. ENJOYING THE WINTER IN OSLO

Describe the reindeer. Why has it such broad feet? How does the sleigh differ from the one used in Canada? In what sport are they going to engage?

the soil becomes sandy and there are swamps and sand similar to those in Denmark. We will see dykes, ditches, windmills, and pumps in the lowlands of the Ems, Weser, and Elbe Rivers. But between these streams there are moorlands, often only a few hundred feet high, and covered with poor soil. There are large areas covered with heather and clumps of juniper bushes, while in places the heather gives way to low hills of white sand. Sheep are herded on the poorer sections, but careful farming and the use of chemical fertilizers have reclaimed large areas. Rye, oats, and potatoes are the chief crops on the more fertile parts. The population is rather scattered, and there are no large towns. This condition prevails eastward to the Vistula in Poland.

The Germans have had the poorer lands, but by industry and science they too are making them produce good crops. It may be noted that Germany produces more potatoes than any other country.

	Bushels of potatoes.
Germany	1,916,730,000
United States	376,100,000
United Kingdom	248,850,000

There are three wonderfully fertile areas in Germany. The first is the Rhine "*Funnel*," which extends from the Ruhr to Strasbourg; the second is the "*Saxony Triangle*" of the Middle Elbe and its tributaries; while the third is known as the "*Silesian Trough*." It lies along the Oder River, with Breslau as its centre. Map 34 will show you the productions of these fertile lands. Sugar-beets are a principal crop in each area. France and Belgium do not produce enough sugar to feed their people, and must import some. But Germany not only supplies her own sixty million inhabitants, but is able to export a considerable amount. The refuse from the sugar-beet is pulped and fed to cattle and pigs, so that it is a great help to dairying and the production of pork and bacon. Wheat is also grown in central and southern Germany. This grain does not thrive on the cold, wet, sandy lands farther north.

As in Denmark, the use of fertilizers and of intensive cultivation has led to remarkable results in making otherwise poor land yield fine crops and in giving Germany the leading place among the nations of Europe in the matter of total agricultural production.

Forest lands. East of the Rhine in southern Germany the land is rugged and heavily forested. The high uplands and mountains are covered

with fir and pine. The forests are under strict Government control. When certain portions are cut over, the brush is carefully removed, and seedling trees are set out. Some areas of poor lands have been planted with trees, which in time produce lumber of considerable value. Portions of the sandy moorlands have also been set out in pine trees. We call this "forest conservation," and at the present time Germany is reaping a fine annual return from her forest agriculture. Toy-making is carried on by the people who live in the small valleys of these southern forest lands. This industry probably began as a winter occupation, but it has grown in importance, until now whole families are engaged in it the year round, and the toys are exported to many countries.

Things to do.—Could you draw a large outline map of Germany? Then mark in the mountains, the river valleys, and the sandy moorlands. Show the three fertile areas, and the forest lands. Where would rye, oats, and potatoes be grown? Where should we find sugar-beets and wheat? Where are toys made?

Coal is found in Silesia, in Saxony, and in the Ruhr. This source of power has led to manufacturing on a vast scale. Near *Breslau* are also deposits of iron, zinc, and lead. There are blast furnaces and steel works, factories which make machinery and glass, and textile works manufacturing woollens and linen. *Breslau* is on the road from the Oder by way of the Moravian Gate to Vienna. It is the supply centre for a large district, and is favourably situated in a rich agricultural region.

Leipzig is the centre of Saxony, on a tributary of the Elbe, and surrounded by the fertile lands of the "Triangle." It is a great market city where many roads meet. There is an old university, and, like Edinburgh, the printing of books has become one of its great industries. *Leipzig* is noted for its leather trade, and is to-day the greatest fur market in the world. In the valleys of Saxony leading back to the mountains, men are mining coal, iron, lead, copper, and tin. There are many manufacturing towns of large size. *Dresden* is noted for its china, and stands at the northern entrance to the lands of Bohemia. West of Leipzig, near the Harz mountains, there is the largest and most valuable deposit of potash in the world. Potash is used as a fertilizer, and its liberal use is one of the reasons why the German people have been able to increase the productivity of their sandy soils. *Stassfurt* is the centre of this industry, and there are large chemical works which utilize the potash in a variety of ways.

Manufacturing in the Ruhr. The great centre of the coal and iron trade of Germany lies in the valley of the *Ruhr*, a small tributary of the Rhine. "Along the *Ruhr* stretches a belt of land about ten miles wide and

forty miles long, in which towns crowd so closely together that they appear to be one continuous city." There are great chimneys, smoke, dirt, and leaden skies. It is another Birmingham or Pittsburgh. The furnaces light the night with vivid flashes, the rolling mills rattle and roar by day. More coal is mined in the *Ruhr* than in any other European coalfield. There is iron ore in Luxembourg, in Lorraine, and in the hills near by, yet large quantities are imported by vessels from Sweden.

Essen is the centre of this industry, and contains the great Krupp machine shops. These are now manufacturing automobiles, farm machinery, and tools. There are mills which turn out steel rails, steam engines, and plates for ships. Dortmund and Duisburg are other large centres in this valley.

The capital of Germany is Berlin. It is situated at the point where the old trade route from the North Sea by way of the Elbe valley to Vienna crosses the road from Paris to Warsaw and Leningrad. It is the largest city of Germany, and in comparison with other European capitals has had a rapid growth during the last hundred years. Railways have been built which ramify in every direction and link the capital with each part of the country, and with the nations to east, west, and south. Due to its central location, Berlin has many factories where machinery, tools, and clothing are made. There are factories which make paper, and the printing of books is important. Other important industries are the manufacture of dyes, glass, rubber, and leather.

Sea-ports. Hamburg is Germany's great sea-port. It is an old city, and is located about sixty miles from the mouth of the Elbe. When ships were small they had no difficulty in ascending the river, and the inland position gave security from the North Sea pirates. To-day the larger vessels dock at the mouth of the Elbe. However, the situation of Hamburg has made it the great storehouse of Germany. In the warehouses are to be found raw materials from every land, such as cotton, wool, rubber, oil, grain, and coffee. As a result there is much manufacturing in the district near Hamburg. *Bremen* on the Weser and *Cologne* on the Rhine are other river ports to which raw material is shipped from overseas.

You may have noticed that the large ports of Germany face the North Sea. Why are there no large ports on the Baltic coast of Germany? The Kiel Canal was completed about thirty years ago. Has this had any effect upon the trade of Bremen and Hamburg? Find Kiel, Lübeck, Rostock, and Stettin. Why are they of minor importance?

Shipbuilding. As the German people developed their manufactures of iron, chemicals, and textiles, they naturally desired to send these out to

the world markets in their own ships. They also desired to bring back in those same vessels the raw products of foreign lands. But the mouth of the Rhine is in Holland, the sea coast between Holland and Denmark is limited to a few good harbours, and the Baltic is shallow and ice blocks the eastern harbours in the winter, while the coal and iron mines are far inland. Yet by careful planning the Germans established shipbuilding plants at Bremen, Hamburg, and Kiel.

From what you have read you should be able to answer the following:—
Which country has the better natural position for the building of steel vessels, England or Germany? Which country has iron and coal at tide-water where the ships are built? England still leads the world in shipbuilding.

Mountain Lands of Northern Europe

Scandinavia. From a study of your atlas maps, how many comparisons can you work out between Scandinavia, Alaska, and British Columbia? Here are a few suggestions: Compare as to latitude, physical features, and climate. Which is larger in area? Which has the larger population? How does the peninsula of Scandinavia differ from that of Jutland to the south? In what ways does Norway resemble British Columbia? What do *we* call a *fiord?*

Norway. The western portion of the peninsula is a high tableland deeply cut by glacial action. Masses of ice still cover the higher parts, and as they melt, streams of water dash down the mountain-sides into the sea. Some of these waterfalls have been harnessed, and the Norwegians intend to develop still further this great natural resource. Below the line of snow and ice the hot days of summer and the damp soil produce excellent mountain pastures, to which the peasants drive their herds of cattle. Hay is cut and cured on long fences, as the ground is too wet. The herdsmen bring the cattle to the lowlands in the fall.

Between the upland pasture and the sea lies the forest belt. The wood of the Norway pine is hard and tough, and is in demand for "pit-props" in the coal-mines of Great Britain. Many of the men who own small farms and a few cows engage also in lumbering, and this is the chief industry of Norway employing many thousand people.

The Norwegians have long been famous for their fisheries. There is so little land fit for farming that the sea provides a large part of their food. Cod and herring are caught off the coast and around the Lofoten Islands. Inshore there are oysters and lobsters, while salmon and trout are caught in the rivers. There are a number of factories where cod liver oil is prepared. A hardy race of fishermen leads to shipbuilding, and the Norwegian

FIG. 157. A NORWEGIAN SCENE
Notice the barley drying on poles in the foreground.

FIG. 158. STOCKHOLM

FIG. 159. ACREAGE OF POTATOES

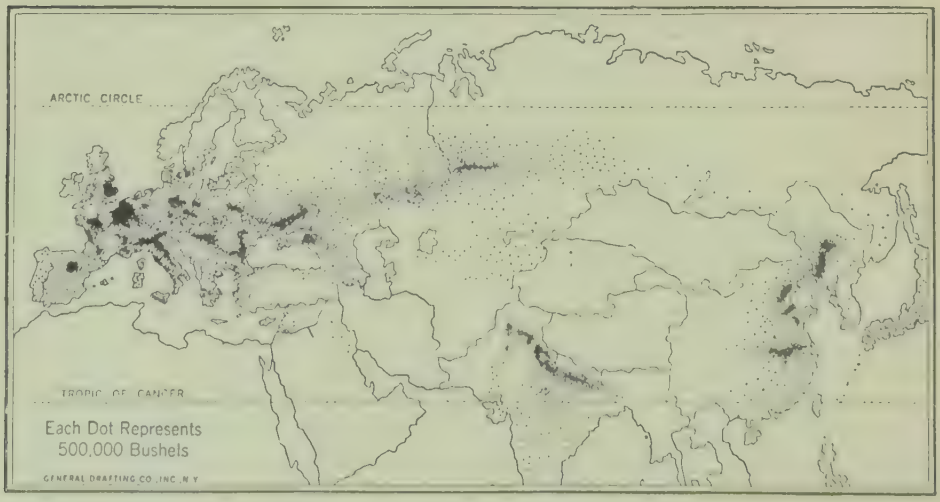


FIG. 160. PRODUCTION OF WHEAT

vessels carry not only their own products to distant lands, but also engage in world trade on every sea. *Bergen* is the chief port on the western coast. It is situated on a peninsula between the Sogne and Hardanger fiords, and is protected by off-shore islands. Here the fishermen bring their salt cod and herring, and from Bergen the ships go out with supplies to the fishing stations and lumber camps along the coast. *Trondhjem*, farther north, is connected by railway with *Oslo*, the capital, in the south. In this wide valley we will find the best agricultural land in Norway.

Sweden. The lands of Scandinavia slope more gently to the east, and there are numerous short, swift rivers which have built up a fairly wide coastal plain which gradually widens to the south. Agriculture is more important than in Norway; oats, barley, rye, and potatoes are grown, and the dairy farms export butter. As in Norway, there is a large forest belt, and lumber, mine-props, and matches are produced on a large scale. There is no coal in Scandinavia, so the people have developed their water-power, and the use of this water-power for pulp and paper mills reminds one of a similar situation in Ontario and Quebec. Sweden has large beds of excellent iron ore, which is exported to Britain and Germany, where the coal is available for smelting.

Stockholm is the capital and largest city of Sweden. It lies on the edge of the southern plain, and is the chief distributing centre. Unlike Norway, the harbours of Sweden facing the Baltic are ice-bound during the winter months, a condition which hinders their development.

The following table will explain some of the things you have just read:—

NORWAY

Population	2,649,790	Area 124,964 sq. m.		*Exports*	
Oslo	258,500	Unproductive	74·7%	Timber	$17,000,000
Bergen	91,443	In forest	21·9%	Pulp and paper	65,000,000
Trondhjem	55,000	Under cultivation	3·4%	Fish and Fish oil	86,000,000

SWEDEN

Population	6,036,100	Area 173,105 sq. m.		*Exports*	
Stockholm	438,900	Unproductive	28%	Timber	$70,000,000
Göteborg	229,638	In forest	60%	Pulp and paper	90,000,000
Malmö	116,144	Under cultivation	12%	Iron ore and other minerals	75,000,000
				Butter and cheese	20,000,000

Russia is a vast country. The Government at Moscow rules over almost the whole of Eastern Europe, while its officers cross the Urals and

administer the laws of that portion of northern Asia which we call Siberia (Maps 32 and 46, Atlas). We shall learn at this time of European Russia. Map 33 will show you that Eastern Europe is a great plain with no natural boundaries within which a number of small nations could develop. From the Carpathian Mountains to the Urals, from the Arctic Ocean to the Black Sea, there is a broad, undulating plain. The rivers are deep, broad, and slow-flowing, and have provided an easy means of communication from south to north. The valley of the Volga has exercised an influence similar to that of the Mississippi, the Amazon, and the Congo.

Russia is simple in its contour and simple in the activities of its people. Agriculture, lumbering, and fishing are the chief industries. Many interesting comparisons may be made with our own land of Canada. Bordering the Arctic Ocean there is a tundra region. The Dvina River compares with the Mackenzie. Its waters freeze during the winter months, but vessels may reach the mouth of the Dvina in summer, and Archangel is a busy port for a few months. Furs are exported, and huge piles of lumber await the cargo vessels which brave the dangers of the Arctic ice.

Logging. To the south lies a coniferous forest which provides lumber for the people who live in the cities and for the peasants who cultivate the treeless prairies of the black lands. The logs are made into long rafts which the lumbermen float down the southward-flowing rivers. On these the river-men build rough shelters in which to live during their slow river voyage. Long sweeps or oars are used to guide the raft to its destination at Kiev, Novgorod, Odessa, Saratov, or Astrakhan, where mills saw the timber into the lumber of commerce. Where the trees have been cut and the land has been cleared we may see small villages and farms. Rye, oats, barley, and flax are grown, because these are plants which will stand the cold climate of the north. Beyond the fields, a winding, muddy road leads through the black shadows of the forest to the next village.

Leningrad, at the head of the Gulf of Finland, is the chief city of northern Russia, and exports timber, wood-pulp, furs, and flax from the surrounding territory. Like other Baltic ports, it has a long closed winter season, due to ice.

The climate of Russia compares with that of the great central plain of North America. See Maps 35, 36, 37 and Maps 10, 11, and 12. The Russian plain is so far from the sea that the winters are very cold, snow covers the ground, and the rivers freeze. The summer heat is intense. It is a climate of extremes. The change from winter to summer is so rapid that the melting snow and ice flood the rivers, which in turn flood the low

plains. As the heat increases the plains dry out and the roads become lanes of dust. Plants grow and mature quickly. The air over the land is warmed and expands, while cooler, heavier air flows in from all sides. This in turn is heated, it is forced upward, and cools so that there is some rain during the summer.

South of the forest belt there is a black-earth belt which extends from the Carpathian Mountains to the Urals. It is similar in fertility to the fertile plains of the Red River valley of Dakota and Manitoba, and to the valley of the Ohio in North America. The climate is too dry for trees, but there is enough moisture for the growing of grain. This is Russia's great wheat-belt.

Peasant Life. The peasants live in villages, and hold their land in common. Each year the land is divided by lot into small strips, and a number of these are awarded to each family. There are no fences, the people pay no rent, and the greater number are too poor to buy machinery. Farming tools are of the simplest pattern. Although the land is fertile, it is so poorly cultivated that the peasants raise an average of only ten bushels of wheat per acre. The houses and sheds are built of clay or wood, and have thatched roofs. A house usually consists of one room with a large brick stove in the centre (Fig. 162). There are beds in the corners, a table, some benches to sit on, and wooden dishes. The men work hard from morning to night; the women and children help in the harvest-fields. The grain is cut by hand and flailed on a threshing-floor. Enough is produced to feed the people of the village and the population in the towns, but there is little for export at the present time. Odessa is the chief port of the black-earth region, and before the war exported millions of bushels of wheat each year.

The dry steppe-lands of south-eastern Russia extend from the Don to the Caspian and beyond. Grazing of cattle and sheep is possible on these semi-arid, grass-covered flats. Hides, leather, wool, and hair are exported.

Moscow, the capital, is situated near the centre of the country, and roads lead out to Leningrad and Archangel, to Warsaw and Berlin, to Odessa and to Siberia. It is the very heart and soul of Russian life, art, and government. The Tula coalfield to the south, with iron near by, has led to manufacturing. Some machinery is made, and there are factories which produce boots and shoes, china-ware, linen, cotton, and woollen goods. The cotton is brought from the Caspian region by way of the Volga River. The Donetz coalfield, near the mouth of the Don River, is another manufacturing centre.

One of the most interesting sights in Russia is the annual fair at

Nizhnij Novgorod, which is situated at the junction of the Oka and Volga Rivers. There are furs from the northern forests, the linen and manufactured articles from the district around Moscow meet the products from the southern plains, the horses, sheep, cattle, and grain. For six weeks Novgorod is a bustling, dusty metropolis. Thousands of peasants and merchants come for the fair. When it is over the city returns to its usual quiet condition, only to burst into sudden activity the following summer.

Although Russia is a great plain with a very limited sea-coast, the fisheries are important, and every large town has its fish market. Herring are caught in the White Sea, cod, herring, and hake in the Baltic Sea, while sturgeon, pike, and salmon are secured from the Caspian and Black Seas and from the sluggish rivers which empty into them. In fact, the name "Little Mother Volga" has been given to the great river because of the large quantities of fish secured from its waters.

In conclusion, we must not forget that Russia controls one of the world's great oilfields, at Baku on the Caspian Sea. The oil is sent through pipe-lines to the Black Sea, where oil-tankers carry it to European markets. In the Ural Mountains there are valuable deposits of platinum, and a large part of the supply of this precious metal comes from the Ural mines.

Russia is a wonderfully rich and fertile country, and will some day take a leading part among the great nations of Europe. The following table is worth considering:—

RUSSIA IN EUROPE

Area	1,300,000 square miles.
Population	131,800,000
In forest	400,000,000 acres.
Under cultivation	200,000,000 „

Little countries of the Baltic. Lithuania, Latvia, Esthonia, and Finland. These states were formed after the World War, when Russia became a federated Soviet Republic. Their lands are low-lying along the Baltic shores. The first three have no natural boundaries and represent areas occupied by people of similar language and racial origins. Farming and fishing are the chief occupations of these people, whose manner of living is similar to that of their Russian neighbours. **Finland** alone possesses a distinctive glaciated surface which resembles the lands of the Canadian Shield. There are thousands of lakes, small streams, and a dense coniferous forest. Lumbering and the manufacture of pulp and paper are important industries. The farms are small and the agriculture is confined to the raising of cattle, dairying, root crops, and hay. *Helsingfors* is the import and export centre.

E.N.A.

FIG. 161. THE KREMLIN, MOSCOW
The citadel containing the imperial palace.

E.N.A.

FIG. 162. INTERIOR OF A RUSSIAN PEASANT HOUSE
Notice the crudeness of the building and furniture and the simplicity of the woman's costume.

By courtesy of Consul of Czecho-Slovakia at Montreal.

FIG. 163. A GREAT CITY OF EUROPE: PRAGUE

Find this city on the map of Europe. Of what country is it the capital? What is the name of the river? What evidence is there that the bridge needs protection from drifting ice?

By courtesy of "World's Markets," New York.

FIG. 164. A CHURCH IN NORWAY EIGHT HUNDRED YEARS OLD

Of what is the church built? How does it differ from a modern church? How does one get over the stone wall?

Poland occupies the valley of the Vistula. It has few natural boundaries of mountain, sea, or river, but represents an attempt to provide a government for a block of people who speak and think alike. The Poles have a long and romantic history, of which they are very proud. They are devoted to their language, to their customs, and to their capital city of Warsaw. The fertile plains of the Vistula produce flax, sugar-beets, grain, and dairy products. The fields are monotonous in their very extent and general flatness.

Warsaw is an important railway centre. It is the capital and the commercial centre as well. There are factories which make boots and shoes, woollen goods, and sugar from the sugar-beet. Lodz is another large manufacturing town. Coal is mined a short distance to the south, and supplies the necessary power for the factories. Poland's trade is by sea through the free city of Danzig, by rail with Russia on the east and with Germany on the west, and by river and rail with the countries along the Danube.

The following is a comparative table of areas and populations: —

	Area (sq. miles).	Population.
Esthonia	23,200	1,750,000
Latvia	25,000	1,500,000
Lithuania	59,000	4,800,000
Finland	132,600	3,500,000
Poland	149,000	26,886,000

The Danube River and the Balkan Peninsula. South of the Carpathians and east of the Alps a great river, almost as important as the Rhine, flows from the borders of Switzerland to the Black Sea. Seven countries enter its drainage basin. It may be divided into the Upper Danube, which flows through the mountain district of southern Germany; the Middle Danube, which comprises the fertile Hungarian plain within the arch of the Carpathians; and the Lower Danube from the "Iron Gates" to the Black Sea. If one nation occupied these lands from the Bohmerwald to the sea the importance of the Danube as a great east–west highway would be tremendously increased. A United States of southeastern Europe would be a blessing to the people of these small countries. It may be that education and mutual interests will some time lead to such a union. Could you name some of the very evident advantages? Make a list of the countries which occupy some part of the Danube River Basin.

Czecho-Slovakia. A mountain state lying to the north of the Danube River, and made up of the old districts of Bohemia and Moravia and the new district of Slovakia. It is over four hundred miles long and barely one hundred and fifty miles wide. The people are largely Slavs, and have a similar language and similar customs. This is a plateau and mountain land. Bohemia has coalfields, iron ore, and water-power from the mountains. There are cotton, woollen, and linen factories, while deposits of clay and sand provide extensive manufactures of china and glass.

Prague is the capital and chief industrial centre. It is situated on the Moldau, a branch of the Elbe, and many of its products go down that river to Hamburg for export. Other roads lead north to Silesia and south to the Danube. Moravia is lower and extends into the Danube plain. Rye, barley, wheat, potatoes, and hops are grown, and brewing is an important industry. Sugar-beets are also important, and some sugar is exported. Sheep and cattle are pastured in the mountain lands, and this is the chief industry of the more sparsely settled Slovakia. The Moravia–Bohemia portion is densely populated, every acre is made to produce its maximum yield, and Czecho-Slovakia is to-day one of the most progressive of the small inland countries of Europe.

Area (sq. miles).	Population.	Population per sq. mile of Bohemia and Moravia.
54,207	13,613,172	310

Austria is a small unit extending from the Alps to the valley of the Danube and the borders of Czecho-Slovakia. The Tyrol portion is ridged with high spurs from the Alps, and the valleys are narrow. What land there is has been carefully cultivated. Most of the people live in the eastern lowlands. Everything centres around Vienna. This famous city stands at the gateway to the Hungarian Plain; a route leads by the Brenner Pass into Italy, while to the west and north roads lead to Paris and Berlin. Vienna is a meeting place of highways, and this made it possible to rule that once-large empire of Austria-Hungary. But the conflicting tongues and stubborn racial pride of the different peoples caused the old empire to break up, and now Vienna is a city too large for its small territory.

Because of their inland situation and lack of coal, the people of Vienna are compelled to manufacture small and valuable articles for export to

other countries. Beautiful silks are woven and artistic leather goods are made from the sheep and goats which pasture in the rugged mountains. Fine jewellery and cutlery are also manufactured, and tobacco is made into cigars and cigarettes. There has been much suffering in Austria since the close of the Great War. The future of the country is none too bright.

Area (sq. miles).	Population.	Vienna.
32,369	6,535,760	1,866,150

Hungary occupies the larger portion of the plain of the central Danube. The people are Magyars of Asiatic origin. Agriculture is the chief industry, and large areas produce corn, wheat, and sugar-beets. The farmers live in villages and go out to work in the fields. Dusty roads lead across the flat lands from village to village. The Danube and its tributaries are the chief highways through the plain. Tobacco is cultivated, and there are sugar mills to take care of the beet and flour mills to grind the wheat. Coal of good quality is mined near Peos, and there is a small amount of manufacturing. Because of its fertile lands, the people of Hungary are far better off than those who live in Austria.

Area (sq. miles).	Population.	Budapest.
35,875	7,980,143	928,995

Romania is a land of encircling rivers. To the north-east the Dneister forms a dividing line with Russia, while on the south the Danube marks off the countries of Bulgaria and Yugo-Slavia. The type of farming which we saw on the Hungarian Plain is seen on the equally fertile plains of the Lower Danube. There are villages surrounded by miles of cultivated fields. Corn and wheat are grown in quantities sufficient for export. Tobacco and sugar-beets are also grown, while vineyards are to be seen on the warm southern slopes of the hills.

In the Carpathian highlands which almost cut Romania in two the peasants feed their pigs on the acorns and beech-nuts of the forests, so that pork is an important product from this section. There is little coal, the

rivers produce little electrical energy, and manufacturing is of small moment. Farming is the leading occupation.

Oil wells have been opened near Galatz, and the sale of this valuable fuel has given Romania a premier position among the small countries of the Danube basin. Ocean vessels come up the river to Galatz, and load wheat, corn, and oil for export.

Bucharest is the capital and commercial centre of Romania. The people are proud of their city, and claim that it vies with Paris in gaiety and in charm.

The Balkans. Yugo-Slavia and Bulgaria, Greece and Turkey in Europe. The true Balkans begin south of the Danube River. The peninsula is formed by the Dinaric Alps and the Pindus range. The latter is partially submerged by the Ægean Sea, and reappears in Asia Minor. The Balkan Mountains are cut off from the Carpathians by the Kazan Pass and the Iron Gates of the Danube, and extend easterly to the Black Sea. Between the Vardar and Moritza Rivers there is the high plateau of the Rhodope Mountains. These are rugged masses of rock rising steeply from the plains. Wolves and bears roam through their forested slopes and there are few inhabitants.

Yugo-Slavia began in the valley of the Morava and gradually expanded to east and west. The larger part of the country is rugged mountain, narrow valley, and rushing mountain torrent. The best arable land is found in the valley of the Save, in the small south-eastern section of the Hungarian Plain, and in the valley of the Morava. In those sections the same type of agriculture is found which we have already noted in Hungary and Romania. Pigs are herded on the forested hill-slopes and fatten on the acorns and beech-nuts. Villages straggle through the narrow valleys almost half obscured by the fruit trees which the peasants guard with tender care. Plums are a favourite fruit, and from these the peasants make a plum brandy—the national drink of the Serbs.

Some iron and a little coal are mined. Smelting of copper is done on a fairly large scale at Bor. However, the mineral products are poorly developed, and there is hardly any manufacturing, the bulk of the machinery and textiles being imported from more progressive countries. The fairly dry climate and the presence of waterfalls have led to the milling of flour and there are fifty flour mills in operation.

Belgrade is well situated to control the trade routes north by the Danube to Vienna, westward up the Save, eastward to Romania, and southward by the valley of the Morava to Salonika and Constantinople. It is the heart of the country, and as one travels through Yugo-Slavia away from Belgrade,

By courtesy of French Government.

FIG. 165. HOW A BEAUTIFUL CARPET IS MADE

How many women are working at the carpet? What are the large rollers for?

By courtesy of Ethnographical Museum, Sophia, Bulgaria.

FIG. 166. SPINNING AND WEAVING IN THE HOME

Try to find out what each of the three women is doing. These are Bulgarian women.

By courtesy of Ethnographical Museum, Sophia, Bulgaria.

FIG. 167. THE YEAR'S VINTAGE IN BULGARIA

What contains the wine? What is used to draw the wagon? Describe the costume of the people.

the life of the people grows more primitive. The roads become mere trails and life in the mountain hamlets shows little advance over that of the middle ages.

Area (sq. miles).	Population.	Belgrade.
96,134	12,017,320	111,740

Bulgaria is now a small state. There are rugged mountains, narrow valleys, and little lowland, yet the people are nearly all engaged in agriculture. The farms are small, one to six acres, and are farmed in a hard and primitive manner. The peasants dig and hoe and cultivate largely by hand. They are not able to buy machines, and the fields are too small to

Fig. 168. Roads, Countries and Capitals of the Balkans

make machines pay. Sugar-beets, tobacco, and grain are produced on the better lands. Large areas of hillside are given over to the cultivation of roses, from which the valuable perfume, attar of roses, is made. Grapes grow on sunny southern slopes, and wine is a valuable product from these hill vineyards. Sheep are pastured on the drier mountain slopes, and their wool provides many cottagers with a winter occupation.

Sofia, the capital and largest city, is situated on an elevated plain where the road from Constantinople passes between the mountains on its way to Belgrade and Vienna. To the south there is a direct route by the Vardar valley to Salonika, and northward by a pass through the Balkans to the Danube. Sofia is well situated as the governing and industrial centre of Bulgaria.

Area (sq. miles).	Population.	Sofia.
39,814	5,100,000	154,025

Turkey. The Turks once ruled over all the Balkan lands and over the valley of the Danube as far as Budapest. But one after another of the subject people revolted from their Turkish overlords, gained their independence, and established those small kingdoms which have just been described. To-day, only a small territory near Constantinople remains under the control of the Turk. Constantinople is the great trading and commercial centre of Eastern Europe. It faces the east, and is far more Asiatic than European. Trade routes lead southward across Asia Minor, through the Bosphorus to the Black Sea, and by the Dardanelles to the Mediterranean. By land an ancient and well-worn route stretches out past Adrianople and the plains of Thrace to Sofia and the Danube. The city spreads over a number of low hills on a promontory formed by the Golden Horn. The bazaars, or shops, are small and open directly on the narrow street. They are shaded from the sun by awnings and overhanging balconies. Within the arched doorway the Turk sits cross-legged in the midst of his wares.

There are shawls and carpets of fine texture and of intricate design; brassware, silverware, and jewellery of oriental design and beautiful workmanship, may be purchased by the delighted traveller. On the quays at the water-front and in the great stone warehouses you may see bales of cotton, wool, and silk, boxes of dates, and casks of wine.

If the Turk had learned to rule his European lands with kindness and with justice, he would not now be confined to the tiny bit of south-eastern Thrace. We hope that the new government of Mustapha Kemal Pasha will act wisely in its dealings with the other Balkan people.

Greece occupies the remainder of the Balkan peninsula. The Pindus range runs down into the sea with a series of mountain prongs, between which lie narrow, steep-walled valleys. The sea stretches into the land in long, narrow gulfs or inlets, and there is little level, fertile land in the whole

peninsula. The Macedonian plain and the valley of the Vardar provide the best farming land, where the peasants grow wheat, barley, tobacco, and cotton. Figs and grapes are grown on terraced hillsides, while the olive is cultivated wherever there is sufficient soil and moisture. The olive groves provide a valuable oil which takes the place of butter with us. The mountains are often bare and rocky, but there is pasturage for sheep, goats, asses, and horses. Since the larger part of Greece is mountainous, there are many mountain villages, many herdsmen, and many tiny patches of garden tilled with utmost care.

Everyone going to the Eastern Mediterranean wishes to see Athens, that ancient city, the capital of Greece, thousands of years old. Temples made of white marble still crown the acropolis, although they were built many centuries ago. Modern Athens is spreading out over the level plain. It has fine stucco homes, wide streets, and electric lights. It is connected by rail and road with its sea-port *Piraeus*, situated on a good harbour. Over a million Greek refugees have fled from Asia Minor since the Great War and have brought with them the art of rug-weaving, which is now of considerable importance. The old mountains of the Pindus and Rhodope ranges have a number of valuable minerals but there is little coal, the streams dry up in summer, and there is little manufacturing. *Salonika*, at the mouth of the Vardar, controls the trade of eastern Greece, and is the chief export–import centre northward to Belgrade and the Danube.

Area (sq. miles).	Population.	Athens.
49,912	6,200,000	385,026

Mediterranean Lands

The Iberian peninsula. We have seen that Europe and Asia almost join where the Balkan peninsula sends its long ridges down to Asia Minor. In the west Europe and Africa almost touch where the Iberian peninsula thrusts out to meet the Moroccan promontory of Ceuta and Tangier. And just as the Turks once crossed over from Asia and overran the Balkans, so in western Europe, another Mohammedan people, the Moors, once crossed from Africa and overran the Iberian peninsula. They were driven back with the greatest difficulty after seven hundred years of fighting, during which the countries of Portugal and Spain gradually developed. You will see some of the descendants of the Moors in southern Spain to this day.

Portugal and Spain are good examples of the way different races of people have grown up in Europe behind mountain barriers. Map 33 will show you the Pyrenees Mountains, and how they act as a high wall shutting off the peninsula from the rest of Europe. There are no low or easy land routes through the Pyrenees, and the railroads skirt the ends of the mountains by the narrow coastal plain on their way to France and Central Europe.

The Sierra Nevada mountains in Southern Spain form a second barrier to easy trade routes with Africa and divert trade to the west by the Guadalquiver valley. Between the great mountain ranges is a high plateau, which slopes abruptly and steeply to the sea. There are few good harbours and few easy routes for trade, either from north to south or from east to west. As a result the people of Spain and Portugal have not kept pace with the growth of other and more favoured lands in Europe.

Since the Iberian peninsula is south of France, you would expect to find a much warmer climate. But the elevation of the mountains and the central plateau makes the interior portions cold and dreary in winter, while the dry summers are hot and dusty. (See Maps 35, 36 and 37.)

Sheep-herding is general throughout the treeless, dry, grassy plains of central Spain. Both sheep and cattle are driven to the mountain pastures in the summer-time, and back to the valleys in winter. In the Ebro valley and in other places where the soil is fertile winter wheat, oats, barley, and rye are grown. Many of the small fields are cultivated in a primitive manner, and the grain is gathered and threshed by hand, by means of scythe and flail. All of this accounts for the sparse population over large areas of the plateau lands. Roads are few, and some are mere trails; the villages are small, and the peasant farmers and herdsmen seldom travel far from home.

FIG. 169. RAINFALL AND POPULATION MAP OF SPAIN

But there are two distinctive trees which flourish under these very severe and arid conditions, and from them the Spanish people derive a large income. One is the cork oak, which grows throughout the mountains of the southern part of the country. Its thick, tough bark is stripped off and taken to factories, which make corks for bottles, mats, and life preservers. The olive tree grows in the lower valleys of southern and eastern Spain, and provides a valuable oil from the fruit.

FIG. 170. THE PARTHENON FROM THE NORTH-WEST AT ATHENS

The Parthenon was a great temple to Athene, the patron goddess of the city, and was beautifully decorated with sculptures. It stands on the Acropolis, a hill about which clustered the sacred buildings of the ancient Greeks.

E.N.A.

FIG. 171. THE ALHAMBRA AT GRANADA
An ancient and very famous castle of the Moorish period.

E.N.A.

FIG. 172. CORK OAKS
A forester seated on a pile of recently stripped cork in Alentejo, Portugal.

Andalusia, including the valley of the Guadalquiver River, is one of the fairest portions of Spain. Olive groves are everywhere, while Seville oranges, tobacco, and Spanish onions are grown in large quantities. Near the mouth of the river is Cadiz, the old sea-port of south-western Spain. Malaga and Valencia, on the Mediterranean coast, occupy small areas of rich coastal plain. There are many vineyards, and raisins are cured from the grapes. From the orange groves thousands of tons of luscious fruit are exported to northern Europe. Many parts of the eastern coast are so dry that irrigation is necessary, and the farms are really small gardens or huertas, where every foot of soil is made to yield its maximum amount. Where it is impossible to irrigate, large areas are covered with esparto grass, which is exported to England to be made into paper. Although nearly three-quarters of the people of Spain make their living by agriculture of some kind, yet large areas of the plateau and of the higher mountains produce nothing but shrubs and coarse grass, while some hillsides are arid, bare, and rocky.

Barcelona, on the plain to the north of the Ebro, is the largest of Spain's manufacturing centres. Woollen goods are manufactured from the wool supplied by the flocks which graze on the dry table-lands of the plateau. Raw cotton is imported, and the factories of Barcelona manufacture the larger part of the cotton used by the people of Spain. Barcelona is a busy manufacturing centre, its people are wide awake and aggressive, and the city differs widely in this respect from the rest of Spain.

Valencia manufactures silks and velvets from the raw silk which is produced in the vicinity. It is also the centre of the largest of the fertile coastal areas, and controls a large trade in olive oil, onions, oranges, grapes, and wine. Malaga is similarly situated farther to the south. It may be noted that over four million acres in Spain are devoted to the olive culture, and produce 1,709,885 tons of olives and 328,486 tons of oil. Spain leads all Mediterranean countries in olive culture.

Spain has been noted for its mineral wealth since the days of the Romans. From Almaden, in southern Spain, comes the larger part of the world's supply of quick-silver. The Rio Tuito mines, near Palos, are still producing a large tonnage of copper ore after two hundred years of mining. Lead is recovered to the amount of two hundred thousand tons annually, while in northern Spain the iron mines are seen as long red scars on the hillsides near Bilbao. Some coal is mined, but it does not coke well, and the larger part of the ore is exported to England for smelting. Bilbao, however, has blast-furnaces and steel mills, and supplies a portion of the steel used in the country. The rugged nature of the peninsula, the lack of easy means

of transport, and the severity of the climate, have all combined to limit manufacturing in the Iberian peninsula, which contains larger and more varied deposits of minerals than any other section of Europe.

Madrid, the capital, is situated in the interior on the plateau, where the trade route from Lisbon meets the north–south routes around the Pyrenees. The climate is severe in winter, and hot, dry, and dusty in summer. The surrounding plain is treeless and uninteresting. Yet, from its central location, Madrid is probably the best place from which to rule the whole land of Spain. Socially and educationally Madrid is the leading city of Spain, and its position as the railroad centre has given it an advantage for the conduct of commerce and business.

	Area (sq. miles).	Population.	Madrid.
Spain	190,050	21,960,000	783,216

QUESTIONS AND PROBLEMS

1. At the last census, 45·46 per cent. of the population could neither read nor write. On what grounds may this be explained?

2. The production area of Spain has been estimated at 113,087,500 acres. Of this amount 56,100,000 acres are under production. Would you call Spain a backward country?

3. From the following, make a graph to show the relative importance of the chief agricultural areas. Olives, 4,055,000 acres; vineyards, 3,334,000 acres; fruit, 1,084,000 acres; general agriculture (grain and gardens), 38,500,000 acres.

Could you make a list of some of the principal exports from the above data?

4. The famous Merino sheep are found in Spain. Counting all breeds there are 18,460,000 sheep in the country. Why should there be so many?

5. The minerals of Spain in a recent year were—

Coal	5,800,000	metric tons.
Lead	200,000	,, ,,
Iron	4,600,000	,, ,,
Copper	1,900,000	,, ,,
Mercury	15,192	,, ,,

Why is it that so little of this valuable ore is smelted in Spain?

Portugal may be described as that portion of the Iberian peninsula which slopes to the Atlantic. Its boundary line runs north along the fall line of the Guadiana, Tagus, and Douro Rivers, where those streams leave their deep-sunk, plateau valleys and flow out across the coastal plain. Portugal receives more rain than Spain, and although the summers are dry, the heat is not so intense as at Malaga or Valencia, on the eastern side of the peninsula.

The valley of the Douro is noted for its vineyards, and port wine is the principal product, shipped from the city of Oporto at the mouth of the river. The wider valley of the Tagus contains the bulk of the population and the

largest area of productive land. The cork oak grows in the hills, and Portugal vies with Spain in producing this valuable material (Fig. 172). Pigs are fattened among the beech groves, and every little hamlet has its herd of swine. Southern Portugal is drier than the northern part, and olive groves cover many thousand acres. Sardines are canned, and form one of the principal exports. As you have probably noted, Portugal is similar to Spain in many ways.

Lisbon, the old sea-port of Portugal, looks back on a glorious past. There are massive, ornate buildings which tell of the time of da Gama and the trade with the Indies. The harbour is large and well sheltered, and is used as a port of call for steamers from England and France on their way to Africa and South America. There is little manufacturing in Portugal. There is little or no coal, transportation is difficult, the roads are crude, and the mass of the people gain their living by agriculture of some sort. Under a strong Government and with a better system of education, the mineral resources, as in Spain, might show considerable development.

Switzerland and the Alps. Centuries ago the people who lived in the cantons or valleys of Lucerne, Schwys, Uri, and Unterwalden united under their leader, William Tell, and set up a Government of their own. Other mountain people joined the movement, and to-day Switzerland consists of twenty-two cantons in the valleys which spread out from the great Alpine system. It is a peculiar country, having no sea-coast, no large area of lowland plain, and no coal; but it does control the main passes through the Alps from Central Europe to the plain of Italy and the Mediterranean. Switzerland thus occupies the position of a buffer State between strong neighbours, who would rather see the neutral Swiss holding the passes than some strong and ambitious power.

Switzerland resembles in many ways the Kootenay district of British Columbia. The higher mountain peaks are flanked with glaciers, from which roaring torrents dash down through narrow, deeply-cut valleys. To the south the streams lead down to the plains of Lombardy, and the valley of the Rhone; to the north other streams drain to the Rhine and eastward to the Danube. Switzerland contains Europe's chief water parting.

The people live in the valleys, where every available bit of arable land has been cleared of trees and put under the plough. Roads wind through the valleys linking each village with its neighbour. An intensive form of mountain agriculture has been developed to a high point of utility. The valley lands produce hay, fodder and roots, which are stored for winter use. In the summer the cattle are driven to the high Alps or mountain pastures. With the onset of winter the herds are brought down to the valleys, where

they are housed and fed until the next spring, when the mountain pastures are again put to use.

By this means large amounts of butter, cheese, and milk are produced in a land of towering mountains and steep-walled valleys. Cocoa is imported and milk chocolate is made in large quantities. The wider valleys near Lake Geneva and Lake Constance are intensively cultivated, the villages are neat and trim, and the people are prosperous.

Switzerland has no coal, but the people have harnessed the water-falls so that a large amount of electrical energy is available. Geneva is the centre of manufacturing. Matches and clocks are made by skilled workmen, and are sold in every land. Italy supplies raw silk, which is manufactured at Zurich and Basel. Many of the people in the small villages have learned to make wooden toys, and this has long been a favourite winter occupation.

Alpine scenery has become noted the world over, and many thousands of tourists spend some part of the summer season in Switzerland. The tourist trade is one of the chief industries in Switzerland to-day. It has been said by Europeans that the Canadian Rockies provide equally good mountain climbing, equally wonderful views and peaks as rugged as those in the Alps. Many Canadians are learning to visit their own mountains before going to Europe and Switzerland. It will not be long before the Kootenay district of British Columbia will draw as many tourists as does the little country of Switzerland.

Fig. 173. The Mountain Range of Italy

Italy is the central peninsula of Southern Europe. At the centre of the Mediterranean, it shares the trade of that inland sea with the Iberian peninsula to the west and the Balkan peninsula to the east. In a similar manner, Italy is cut off from Northern Europe by the wall of the Alps, and men have had to dig long tunnels to provide easy routes from the fertile Lombard plain to the central plain bordering the North Sea. The Apennines curve down the length of the peninsula, leaving fertile but narrow coastal plains. We may call the Apennines Italy's backbone.

By courtesy of Swiss Federated Railways.

FIG. 174. SWISS VILLAGE IN A VALLEY

Notice the mountains on each side, the flat valley between made of fertile, alluvial soil, washed down from the sides. A river runs through the far side of the valley.

By courtesy of Swiss National Railways.

FIG. 175. STICKING HIS HEAD AMONG THE CLOUDS

The mount shown is the Matterhorn, one of the most notable of the peaks in Switzerland. What is the white in the foreground? Why are there no trees?

The climate is of the usual Mediterranean type, rain in winter and hot and dry in summer. The olive tree is cultivated throughout the peninsula, and Italy ranks next to Spain in the export of olives and olive oil. Grapes are grown and wine is produced in large quantities. Sweet chestnut trees grow on the higher slopes of the Apennines, and the peasants gather the nuts, which they dry and grind into a flour. From this a kind of porridge is made, called *polenta*. Sheep are raised for their wool and goats for their milk. The Italian peasant farmer must work hard in order to make a living for his wife and children.

The plain of Lombardy, which comprises the valley of the Po River, is the fairest portion of Italy. The summers are hot, but the river supplies water for irrigation works, and the fertile land yields a rich harvest. Wheat and corn are grown, and macaroni, the favourite Italian dish, is made in large quantities. Back from the river herds of cattle feed on the grasslands, and dairying is an important occupation. Mulberry trees have been planted in rows beside the fields, and these provide food for the silk-worm. Italy produces large amounts of raw silk, and the silk-worm culture is increasing in importance.

The rivers which dash down from the Alpine heights provide millions of horse-power, which the Italian people are utilizing to the fullest extent. Manufacturing is growing in importance as advantage has been taken of this white coal. *Milan* manufactures linen from the flax grown in the lowlands of the Po valley and silk from the local raw product.

Venice is situated at the head of the Adriatic Sea on a number of islands. It was originally chosen as a place of refuge, but the location proved to be a good centre, for trade and Venice grew to be a great and powerful city. Ships from the eastern Mediterranean brought their cargoes up the Adriatic and unloaded at Venice. Thence trade routes led up the Po valley to Milan and over the passes into France. Still other routes led up the Adige valley and over the Brenner Pass to the Danube and Central Europe. In Venice the streets are canals, gondolas are used in the place of autos or street cars, and the front door opens on a strip of smooth, deep water. There are great palaces and wonderful old churches which remind one of the days when Venice was Queen of the Adriatic.

Genoa, on the western side of the peninsula, is another ancient city. It is situated at the head of the Gulf of Genoa, where an easy pass leads through the Apennines to the Lombard plain. Its trade is still important, and resembles that of Marseilles, the great sea-port of southern France.

Naples is the largest city in Italy, and is situated on a fertile plain which slopes down from the encircling mountains. A pass leads over the mountains to the eastern shore, and there are roads leading north to Rome and

south toward Sicily. Vineyards clothe the hillsides, and there are orchards producing oranges and lemons. In the distance towers Vesuvius, its smoke wreath a grim reminder of Pompeii and Herculaneum. Over all the bright sun shines down on the blue waters of the bay and on the white homes of the city—a fair and beautiful land.

Rome is the capital of Italy. It is situated midway of the peninsula on the Tiber River, a few miles above its mouth. Here you will see the Vatican and the great church of St. Peter. There are relics of the days when Rome was mistress of the whole Mediterranean—old buildings, old tombs, and old roads. Rome is a link with the past. It is also modern in many respects, and is the social and artistic centre of Italy. Visitors to Europe wish to see Rome, and the tourist trade is probably the most important feature of its business life to-day.

Within the last fifty years several million people have emigrated from Italy to North and South America. The land of Italy is densely populated, and it has been hard for the growing population to find work within the confines of the country. When you hear people speak of sunny Italy, it is well to remember that there are many mouths to feed, that it is not easy to make a good living where there are so many people, and that those who would succeed must put forth even greater effort than in a country not so densely populated. Canada and the United States are gradually filling up their vacant lands with their native-born and with immigrants from overseas. Many people consider it an advantage to live in a new country where there is still room for those who desire to develop its resources.

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized

The chief jute manufacturing establishments of the world are located in Dundee, Scotland.

Denmark, though one of the smallest countries, exports more butter than any other, and New Zealand and Australia are good second and third.

If you have a diamond ring, the probability is that the diamond was polished in Amsterdam, Holland; or, Antwerp, Belgium.

When you pull a cork from a bottle the chances are three to one that the light stopper came from Spain.

Every second chestnut, almond, walnut, and hazel comes from the nut groves of Italy.

Germany leads in the growth of Irish potatoes.

Spain and Italy run neck and neck for first place in the growth of the olive.

France is the greatest manufacturer of wine and the French people are also the heaviest drinkers of wine.

Three out of every four yards of linen cloth came from Russian flax.

Germany is the greatest importer of iron ore and France is the greatest exporter.

The greatest and most magnificent bridge in the world is the Forth Bridge, which crosses the Firth of Forth in Scotland.

Belfast, Northern Ireland, leads the world both in the quality and quantity of linen goods manufactured.

FIG. 170. REGIONS OF ASIA WHERE RIVERS DRY UP

What four areas in Asia do not drain to the sea? Is the rainfall in them heavy? (Map 49 in Atlas.) What large expanses of water are in these regions? What important rivers are in these regions? What regions are over 12,000 feet high?

CHAPTER XV

ASIA, THE CONTINENT OF GIANTS

The greatness of Asia. We are now going to study Asia, the most wonderful of all the continents. This giant is twice as large as Africa, larger than the whole Western Hemisphere with Australia thrown in, and though our country has a vast area, almost six Canadas could be carved from this mighty continent. Its swarming population is so great that, if all the people in the world were arranged in a line, three out of every five would be Asiatics.

It is also a continent of giant mountains, giant plateaus, giant plains, giant rivers, and giant deserts.

Its people in the past have also been giants in the strength and perfection of their bodies and in the superiority of their minds.

While the rest of the world, with the exception of Egypt, was dressing in skins or going naked, drinking one another's blood, and living little better than beasts, highly-civilized empires, whose buildings, ornaments, and monuments, as they are dug from the desert sands, are still the wonders of the world, occupied the lands of Western and Central Asia. Religion more than anything else has made people what they are, and all the great religions of the world took their rise in Asia, and Asiatics were their founders.

Asia gave to Europe not only religion and civilization, but also its people. At different times the populations of Central Asia have boiled over, and its surplus people have flowed eastward into China, southward into India, and westward into Europe and Africa. The English, Germans, Russians, Hungarians, and peoples around the Mediterranean are the children of races who came originally from Central Asia. This fruitful continent also gave to the world rice, wheat, barley, oats, millet, many vegetables, such as onions, peas, beans, radishes, and spinach, and nearly all the cultivated fruits, such as apples, pears, plums, cherries, almonds, mulberries and raspberries. What would the world do without horses, sheep, goats, asses, and camels? All of these were first tamed and used by man in Asia, and thence were introduced into other parts of the world.

The giant highlands. Suppose the water surrounding the continents rose six thousand feet, then nothing but a few narrow ridges would rise

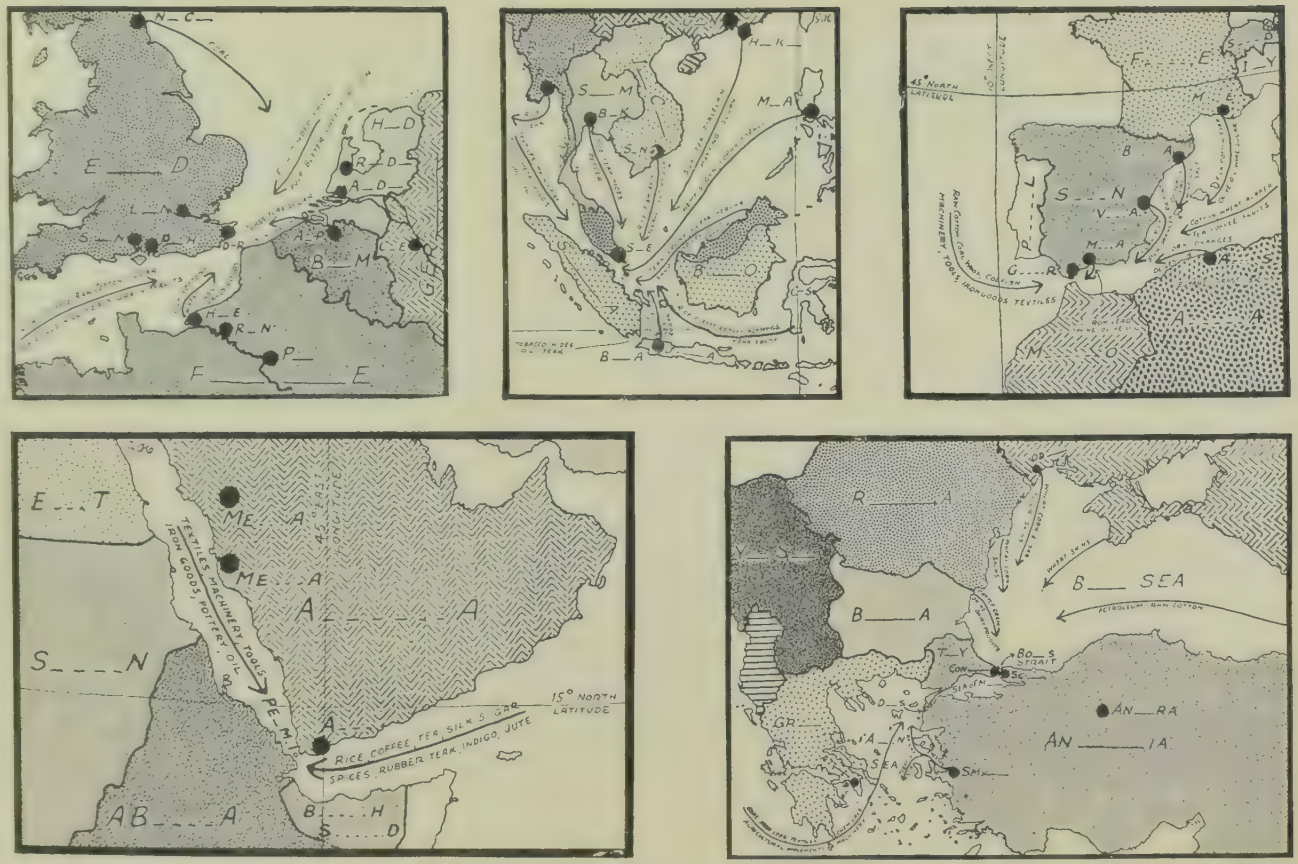


FIG. 177. THE FIVE THROATS OF THE WORLD

Three of the important straits in the picture can be found on Map 33, and the other two on Map 46. Find the name of each. From Map 2 estimate which has the greatest shipping and which the least. Fill in the names of all the places whose initial or first and last letters are marked. After the name of each city write some of its products. State the products going in each direction through each strait. Find a British fortress that guards each of four of these straits. What country is on each side of the straits? What bodies of water does each strait connect? Which is most useful to Russia? Which to China? Which to India? Which to Norway? Which has the largest city on its border?

FIG. 178. A ROYAL TIGER HUNT

What king is shooting? How many elephants are there? Where does the driver sit? Describe the eagle. What do the drivers wear on their heads? This is a reproduction from a painting in a panel of the staircase in the palace of the prime minister of Nepal. Find Nepal on map of Asia (Map 46 in Atlas).

above the water in other continents, but in Asia a fair-sized continent would still project above the seas. Even if the oceans rose twelve thousand feet, an island half as large as Australia would rear its giant form above the waters of Asia, and peaks higher than Robson would still be found in the Himalaya Mountains (Fig. 176).

The roof of the world. Tibet, the highest plateau, is called "the roof of the world." There it rises in the interior of the continent, the loftiest, windiest, and most barren highland on the face of the earth (Fig. 176). On the north and south it is held up by the highest mountain ranges in the world. West of it is the Pamir, a centre from which radiate at least five giant mountain ranges. To the south-east extend the mighty Himalayas, which have one foot on the high Tibetan plateau and the other in the plain of the Ganges River, fifteen thousand feet lower. This giant chain, which in Canada would stretch from Winnipeg to Vancouver, is enclosed in icy armour, and raises its average peaks above the highest point in North America. Its lowest passes are at a greater height than Robson, the loftiest mountain in the Canadian Rockies. The range is crowned by the towering peak of Everest, whose snow-capped dome pushes up almost six miles into the heavens.

A range longer than the Himalayas, and forming the northern bulwark of Tibet, extends eastward from the Pamir. North-eastward runs a high ridge till Bering Strait is reached. Westward from the Pamir branch forth two ranges, which form north and south supports for the Plateau of Iran, come together again to form the mountain knot of Armenia, and continue as a complex plateau to the western end of Asia Minor.

Enormous gleaming glaciers fill the hollows of the sides of all these mountains. From the muddy feet of the glaciers, rivers leap full-grown into life and rush through gorges of awful depth. Down these the eye pierces a thousand feet, frightened, but fascinated, by the picture of gloomy rock and gleaming green, of streams trickling or boiling through lonely glens, and of solitary villages shrouded in trees.

Two other plateaus are separated from the main interior highlands by plains that are painfully flat. The greater part of Arabia is a highland desert, whose dismal face is made of parched and burning sands alternating with still more dreary ridges of rock and flinty stones. The peninsula of India, called the Deccan, is the remains of a weather-worn plateau, which was old when Tibet, now the "roof of the world," was the bottom of an ancient sea.

People of the highlands. Asia, great in its mountains and plateaus, is also gigantic in its deserts. The great plateaus receive little rain, and on

By courtesy of Korean Railways.

FIG. 179. TRANSPORTING BAGS OF RICE IN KOREA

How many bags does each man carry? What does each bag of rice weigh? How are the loads fastened on their backs? What becomes of the load when they wish to rest? To what nation do they belong? Describe their clothing. Of what is the roof of the house made?

By courtesy of George D. Hubbard.

FIG. 180. CHINESE GARDENERS BRING VEGETABLES TO MARKET

This is a branch of the Yang-tsze River in Central China. How wide is the stream? Of what are the rafts made? How are they fastened together? What vegetables do you see on the rafts? What kind of pole is in one man's hand? What use is it?

By courtesy of Japanese Government.

FIG. 181. JAPAN'S SACRED MOUNTAIN, FUJI

This is the highest peak in the country. What shape is the mountain? How are such peaks formed? What covers the peak? Why do you think this is a very high peak?

By courtesy of Japanese Government.

FIG. 182. JAPANESE AT HOME

What are the girls doing? What shade is their hair? Describe their clothes. What covers the floor? On what are they kneeling? What toys are seen? What furniture is in the room? Why are there no chairs? What decorations are on the wall? Are the windows made of ordinary glass? Find two drawers. Describe the stand with the urn on it.

account of their height they are icy cold in winter, and all but the highest are scorched in summer by a nearly vertical sun shining from an unclouded sky. In the great stretch of highland from Tibet to Mongolia the miserly soil brings forth such scanty growth that the scattered tribes have to lead their flocks and herds from spot to spot as the grass springs up after each niggard shower. These are the *nomads* of the desert, who live in tents made of skin, and feed on the flesh and milk of their flocks of sheep, goats, horses, and camels. As Nature is so stingy here, the different tribes are always striving for the scanty pasture lands. From these hardships and struggles the tribes develop great skill and forethought, and open-air life and long marches make erect, muscular bodies capable of great endurance. It is no wonder that some of these desert nomads have the most perfect physique of any people in the world, and that they have given to Europe some of its finest stock. As has already been stated, it was the overflow of these people from Central Asia that gave Europe its chief races.

Dwellers by the rivers of water. No rivers rise in these rainless regions, but many bubble forth full-born from the feet of the glaciers in the adjoining mountains, and wind through the desert, whose thirsty sands suck in the refreshing water until the stream loses itself in a frayed tangle of threads of water. Prosperous villages fringe these streams, and their life depends upon the irrigated land. No greater contrast is found in the whole world. On the one hand is the bare, deserted, scorching sand; on the other, cool refreshing water, and rich loam bearing on its bosom luxurious greenery. All this change is produced by the magic touch of water.

The fertile patches bordering these desert streams form pleasant oases for the weary traveller. There, on the harsh face of the vast tablelands, caravans wind their weary way for days and weeks through a changeless scene of dreary, burning red sand, dotted at best with thorny acacias or coarse spiny bushes. What a joy to the eye when they suddenly behold the date and walnut groves, the rice, cotton, and poppy gardens, contrasting in their emerald green, pure white, and deep purple with the dull, tawny surface of the sand! They seem to have reached a Garden of Eden in the midst of a barren wilderness when they pass from shimmering, blazing heat into the cool shade of graceful trees arching above the road, with a trickling stream like a silky ribbon along its centre.

Such towns and villages, with their square, flat-roofed, whitewashed houses glistening in the sun, are found in hundreds along the rivers; these get their water from the never-failing glaciers of the high mountains, and thread their courses to the hot interior, often to disappear exhausted in the greedy sand.

The continent of great rivers. Though other continents can boast longer rivers than Asia, none can compare with her in their numbers. Seven of the twelve longest rivers in the world are wholly in this continent. From the central highlands, among the wildest parts of Nature, they hurl themselves down the slopes to the broad lowlands and wind their turbid streams across level plains to the sea (Fig. 176).

The largest plain in the world. Three of the great Asiatic rivers, the Obi, Yenisei, and Lena, begin as tumbling mountain streams, rage and thunder down from the central plateau, and then glide northward across the largest plain in the world. One can pass down these rivers across the plain, day after day and night after night, for hundreds of miles, first through level, grassy steppes, and then into the sombre pine forest. Each day one gets farther and farther from the abodes of men and nearer to eternal ice. Nameless rivers, springing from unknown depths of evergreen forest, cut through the high banks to pour their muddy water into the parent stream. At last the rivers emerge from the forest to the dismal tundra, bare of trees and covered with dull moss and pallid lichen. Then in wide, barren, icy deltas they pour their cold waters into the Arctic Ocean.

The prairies of Asia. The steppe in the south of this great Siberian plain is dry and burnt in summer and autumn. Winter comes early, and then for five months howling winds sweep across dreary wastes of drifting snow. Spring comes with a bound and works wonders. As the snow melts the water trickles and glides, and finally collects into streams. When the thirsty soil has sucked in the melted snow, the two magicians—water and sun—combine, and from the sterile, withered earth of autumn, grass and herbs shoot up as though by magic. Buds burst, flowers bloom, and the steppe decks itself in a glory of colour.

As in Canada, so in Siberia, these grassy plains are rapidly becoming wheat and pasture lands, and steady, plodding farmers, brought from Russia on the great Siberian Railway, are replacing the nomad herdsmen who for countless ages have wandered at will over these broad plains pasturing their sheep, goats, asses and camels.

The deltas of Asia. All the great rivers that flow east toward the Pacific, and south toward the Indian Ocean, have broad deltas at their mouths. For many thousands of years they have been lowering high plateaus, chiselling out fantastic gorges, and eating away massive mountains. The sediment from this destruction, which makes the rushing water tawny in the upper reaches, is deposited in the still waters near the mouth. So great is the erosion of these rivers that some of their deltas are larger than great countries like France and Germany. Three of these along

By courtesy of Manchurian Railway.

FIG. 183. THE HUM OF INDUSTRY IN PORT ARTHUR

On Map 44 in your Atlas find this port. In what country is it, and on what expanse of water? What railway has its terminus at this port? To what country does the city belong? What writing is on the post? How is the port lighted? How many bundles are on the carts? These bundles contain cocoons of silkworms gathered wild. How many wheels has each cart? What animal pulls the carts? Name all the kinds of freight on the wharf. How many steamers are in the harbour? What is the use of the carts near the electric light pole? Name five different methods of transport shown in the picture. Describe the dress and appearance of the people. To what race do they belong?

By courtesy of P. Victor Co., Bagdad.

FIG. 184. AN ARAB BEAUTY

Women of the Mohammedan religion keep their faces covered when in the street or in public places. The veil is known by the name of Yashmak

By courtesy of P. Victor Co., Bagdad.

FIG. 185. AN ARAB BEGGAR AND A STORK

This poor man lives at Basra in Iraq. What kind of boots has he? What is on his head? Has he a beard? How large is the stork? The stork lives in cities, and as it eats garbage from the streets it helps to prevent their festering filth from causing sickness.

the lower courses of the Amur, Hwang-ho, and Yang-tsze-kiang form the plains of China. The two latter rivers find their way to the coast right from the heart of Tibet. No less than five of these deltas of first-class importance are found at the south; one at the mouth of the Mekong in Indo-China, one at the mouth of the Irrawaddy, one along the lower course of the Ganges, which melts above into the delta of the Indus, and one in the Persian Gulf. The first four rivers rise in Tibet, and to reach the plains below, gnawed awful gorges through the towering Himalayas and other mountains in their path. The fifth great delta plain, coming down to the head of the Persian Gulf, is wedged in between the plateaus of Arabia and Iran, and has been formed from the sediments of the Euphrates and Tigris Rivers, which are fed by the snows of the mountain-knot of Armenia. This flat alluvium has nourished the greatest empires of the ancient world.

Human bee-hives in the plains. Packed into these delta plains are the densest populations in the world. Indeed, it is safe to say that one-third of the human race obtains its living from the rich soils of these well-watered areas. As most of these plains have a dry and a rainy season, irrigation during the winter allows them to grow cool-weather crops, such as wheat, barley, and millet. The warm rains of summer excite a mushroom growth, and great crops of rice, cotton, opium, tea, jute, and indigo are harvested. Viewed from the hills above, the small, square fields make the plain look like a vast checker-board, which in the spring is spread out in a flat sheet of greenery, and in the summer is mottled by the white or purple of poppies. In autumn the people harvesting in the rice-fields below look like swarms of little black insects on a plate of gold.

The struggle for life among these dense populations is keen. Every block of the checker-board, consisting of a few acres, is a whole farm, and this has to feed a large family. Under such niggardly conditions it is no wonder that more than half of this swarming population is always hungry. Nearly all are primitive farmers, who use hoes instead of ploughs, sickles instead of binders, and a stick instead of a threshing-machine. A yard or so of cheap cotton cloth covers their nakedness, and a hut made of bamboo, and roofed with grass, or rushes, scarcely protects their bodies from the weather.

Where men take the places of horses. Except in the plain of the Indus and Ganges, railways are almost absent from these deltas. Even roads are few, crooked, and bad. Goods are carried for hundreds of miles along narrow and irregular paths. The shoulders of men bear loads which in other countries are carried on the backs of horses and asses (Fig. 179), and wheelbarrows replace carts and wagons. Most of the great rivers, as

they wind like sheeny ribbons across the plains, are dotted with boats of all shapes and sizes, which carry farmers' produce out to the great ports at the mouths of the rivers. The Hwang-ho alone is too swift and treacherous for navigation.

The most bustling river in the world. The great river of China is the Yang-tsze. Rolling down from the plateau of Tibet, it flows through the most fertile district, and has a greater population crowding its valley than any other river. More than twice the population of the United States lives within its watershed. With its many large branches it has a line of navigable water that would stretch half around the world. No other river has so many ships or carries so much freight.

In the upper course of this river, among the hills, huts, looking like birds' nests, cling far up on its almost vertical cliffs in order to escape the floods, which sometimes rise ninety feet, while in its lower courses hundreds of thousands of families live their whole lives on small houseboats, huddled along the shores. Thousands of villages along its banks nestle among their bamboo thickets and trees, while cities stand guard at the mouth of every tributary. The greatest of these cities is the beautiful Hankow, the commercial centre of China. It is six hundred miles from the mouth, at a point where two important branches join the main stream. At the mouth of the river in a splendid situation is Shanghai, the greatest seaport in the country.

A dense population with few cities. Though one-third of the people of the world jostle for life on these delta plains of Asia, yet there are few large cities. Europe, with a population less than is found in these plains, has seven cities larger than Hankow on the Yang-tsze and Calcutta on the Ganges—the two largest delta cities. Most of the large cities are on the coasts and rivers, and as there are few manufactures, they are chiefly engaged in trade. The city streets swarm with people, have mean houses, and narrow, winding ways, festering with filth thrown from the houses and left to breed disease.

Rivers that never reach the ocean. Not one drop of rain that falls on over five million square miles, an area nearly as large as Canada and half that of the United States, ever reaches the ocean (Fig. 176). The rivers in these regions of internal drainage either empty into such lakes as the Caspian and Aral Seas or wind their way through the thirsty desert, where the gaping sands suck in the water eagerly. Such a river as it progresses becomes smaller and smaller, and finally frays out into a number of threads that lose themselves in the sand. The area of internal drainage is shown in Fig. 176.

The most notable winds in the world. Over half the people of the

world nervously watch for the beginning of the *summer monsoon*, for upon it everything depends. If it arrives in time and brings abundant rain, the countries will yield a bountiful harvest, but if the monsoon fails, crops refuse to grow, and grim famine stalks through the desolate land and blots out millions of lives.

The monsoons. The highlands of Asia become bleak and cold in winter, when the sun is far south, and cold dry air from Tibet blows in every direction. In China and Japan there is a west wind, in India and Indo-China a north and north-west wind, while in Siberia is a south wind. The same region in summer has an almost vertical sun, shooting burning rays through a cloudless sky against the desert soil. Then Central Asia becomes the hottest region in the world, winds blow in from the ocean, over the parched land, and bring rain to nourish the thirsty soil. These winds that blow inward from May to October, and outward from November to March, are called the monsoons. They make the climate of South and East Asia.

A change from death to life. In the monsoon region the dry season has reached its greatest intensity by May. Wind from the central plateau no longer cools the air. The burning drought of April has withered up the juicy vegetation of the jungle, and every tree has shed its leaves and looks as bare as those of Canada in December. Grass has burned to dust, while great cracks wind snake-like over the naked, parched ground. The soil on roads and fields has crumbled to a fine powder, which settles on the branches and thirsty brushwood.

Animals have also fled from the scene of desolation. Insects—their food gone—disappear under the dry ground. Butterflies, which recently lit up the forest with their brilliant splashes of colour as they hovered over the flowers whose beauty they rivalled, have forsaken the bare scene. Even the lowly snail, shut in his stony house, crawls to cracks in trees or soil, and seals up the opening in his shell. Birds are few and silent, and flit about furtively. Wild animals forsake the arid jungle to lurk near the water-supply of the village.

Man alone is left to endure, and even he has lost all force and vigour. The intense heat, the close murky air, and the leaden sky fill him with dullness and languishing. It is impossible to work and difficult even to rest.

The air is heavy with moisture, and the sky, which all the winter was of a brilliant blue, has assumed the sullen tint of lead; not a breeze disturbs the motionless rest of the heavy clouds that hang languidly above. Each day becomes hotter than the last, and the sky more and more overcast.

The surf on the shore begins to rise, and towards the end of the month, when life has become almost unbearable, sudden lightning in the distance gives hope of a change. Now sheets of lightning flash through the clouded sky, and a crash of thunder ushers in the summer monsoon, which breaks over the thirsty land. It comes not in showers, not even as in the pouring rain of a violent thunderstorm in Canada, but in great sheets of water which flood the land and make the rivers burst their bounds. In Canada a thunderstorm is over in an hour. Not so the monsoon. For hours together sheets of water bombard roofs and lash trees, making such a din that the voice is drowned and sleep impossible.

At last the sky is blue again. The air has a refreshing coolness, and even in a single day the bare earth is coated with green, the buds of trees burst forth, and like magic a mantle of leaves clothes the forest. In a week what was a parched desert becomes a steaming jungle, almost impassable with rank grasses and rushes. In ponds, which were clouds of dust, swarm insects, frogs, and fishes that have crawled up out of the mud. The air hums with the vibration of insect wings. Glorious moths and butterflies show the sheen of their metallic tints as they flit among the trees, and the air is blithe with the song of birds, whose gorgeous colours rival those of the butterflies.

The blue sky and clear fresh air rouse man, as they do all nature, and he is soon busy planting his rice-fields, trimming his tea-shrubs, and preparing the soil for cotton, wheat, poppy, millet, and all the other wonderful crops that the monsoon countries bear.

It is no wonder that the monsoon is considered a good and great god, to whom thankofferings are brought by the poor peasants of Asia.

The fringe of Asia. Along the east coast of the continent is a great line of islands, standing like a wall against the Pacific Ocean. At the south this line expands into the greatest archipelago in the world, and is called the East Indies. Standing like the main tower at the centre of the eastern wall is the great Empire of Japan. On these small islands, for together they are less than half the size of the province of Ontario, there are packed almost seventy millions of the cleverest and most progressive people in Asia. Seventy years ago they were the most backward of all civilized peoples, but to-day they can take an equal place with all the great nations of Europe. Although chiefly a farming nation, the smoke from their factories already darkens the sky, and to-day two of the largest cities in Asia, Tokio and Osaka, are in the flowery kingdom of Japan.

FIG. 186. WHERE OUR DATES COME FROM

(*a*) A date garden. (*b*) Bunches of dates. (*c*) The date-gatherer.

How are the trees arranged? How far apart are the trees? How tall are the trees? Where are the leaves attached to the stem? How large are the leaves? What is the appearance of the trunk? The marks are scars where leaves have fallen. Where are the fruits? How do the dates grow? What shape are they? How are they picked? How does the Arab climb the tree? What is he holding in his left hand? Of what use is the rope? Is there any grass or other vegetation except the trees? Why?

By courtesy of Government of Siam.

FIG. 187. ALL ABOARD! A RIDE ON AN ELEPHANT'S BACK

CHAPTER XVI

AFRICA, THE CAKE-LIKE CONTINENT

The continent like a cake. Africa is a three-storeyed cake in which each layer is smaller than the one just below. The edge of the plate projects slightly beyond the lowest layer. The cake on its plate presents four steps, no matter at which part of the margin it is approached.

Africa is built of horizontal layers, and the interior in many parts is reached only by ascending several steep slopes separated by flatter stretches. A narrow coastal plain, like the rim of the cake-plate, runs around the edge of the great continent. In most parts this rim is very narrow, often not more than fifteen miles wide. Then the successive, steep slopes, like the edges of the layers of the cake, follow. Viewed from the sea these steps look like successive mountains running parallel with the coast. The frowning rows of receding slopes give the continent a forbidding look from every coast. They repelled the early explorers, and made the interior of Africa one of the last parts of the world to be traversed.

The coast of this continent is almost as unbroken by any bold projections seaward, as it is unrelieved by broad river mouths or inlets of any kind. Few harbours invite boats to land. Therefore every nick in the coast that can shelter a ship, has become a focus from which settlements have spread inward. Capetown in the south, the mouth of the Niger River in the west, Alexandria on the delta of the Nile on the north, and Beira on the east, are such centres from which railways spread into the interior.

The rim of Africa, unlike that of the cake, is not round, but is the shape of a badly-formed triangle.

The top of the cake. The top of a cake is often wrinkled through unequal rising. The surface of the African cake is likewise uneven and partly for a similar reason, for internal forces have pushed some parts up higher than others. Across the north-west the snow-capped Atlas Mountains look down on the Mediterranean Sea. The whole southern half is fully a layer higher than the broader northern half. Just as cracks occasionally appear on the surface of a cake, so two of the most remarkable rifts in the world run north and south through Africa. Imagine two great cracks only a few miles apart to run side by side for hundreds of miles, and the

layers of rock lying between them to slip down, in some places several thousand feet. Such a gash in the surface is called a *rift valley*. Two such gaping wounds have rent the surface of East Africa. The lowest parts of these, filled with water, give Africa some of the largest and deepest lakes in the world. One rift valley runs through Lakes Nyasa and Rudolph and then through the Red and Dead Seas. The other farther west runs through Lake Tanganyika and the string of lakes to the north of it.

The continent that is running dry. As the top layer of this African cake rose higher around the edge than towards the centre, water collected in great lakes in the interior. But great rivers on three sides of the continent have broken their way through the raised rim and come tumbling down in rapids and waterfalls over the edges of the successive layers, spreading out into deltas or estuaries on the narrow coastal plain. The Nile in the north is the great river of the past, the Congo in the west is the river of the future, and the Zambezi on the east is bound to play a notable part in the growth of Southern Africa.

These three giant streams, with the Niger and many others, breaking through the raised rim of the continent to reach the sea, have played their part in eroding unevenly the surface of the continent. Year after year and century after century they have been cutting their valleys deeper and wearing down the lip through which they drain the hollow basins on the top of the African plateau. As they do this the great shallow lakes of the interior shrink in size. In South Africa, regions covering thousands of square miles, which were occupied by lakes less than fifty years ago, are now nothing but a patchwork of marshes and swamps. Great areas of the Sahara Desert, which formerly were mirrors of blue water, are now covered with billows of drifting sand. Lake Chad at the south of the Sahara Desert is also steadily shrinking in size, not because it is being drained to the sea, but because in this part of Africa the rainfall is becoming less and less. Thus we see that rivers and rainfall are conspiring to dry up the top of the African cake.

A Trip Down the Nile River

The puzzle of centuries. We are standing under a vertical sun in the heart of Africa. Stretched before us as far as the eye can reach are the blue waters of Victoria Nyanza, the source of the River Nile. For a thousand years explorers sought this mysterious lake and we are now on its fringing shore. With the exception of Lake Superior it is the largest mass of fresh water in the world. Green islands stud it on every hand, and the warmth of the sun decks every shallow with reeds and rushes three times as high as

By courtesy of Netherlands Chamber of Commerce

FIG. 188. DRIVING A BARGAIN IN JAVA

The lady is Dutch. What colour is the native? What has he on his head? Describe his hat which is on the ground. How does he carry his load? What fruit is he selling? What plants has the lady, in pots? Name all the evidences in the picture that the climate is hot. Find Java in Map 2 in your Atlas.

By courtesy of Government of Siam.

Fig. 180. A Wonderfully Carved Shrine in Bangkok, Siam

Find Bangkok in Map 44 of your Atlas. In what country is it? Name the river on whose delta it is. How many images are there? This is a Buddhist shrine, and Buddhism is the chief religion of the country. Notice the beautiful carvings and the grace of the structure.

our heads. We dare not wander in these reedy marshes, for many a hungry crocodile and lumbering hippopotamus lurk in the mud ready to pounce on their prey.

A steamer takes us across to the north shore, and we enter the Victoria Nile. After passing roaring falls and brawling rapids we reach Albert Nyanza, a beautiful mountain lake with majestic snow-capped mountain peaks reflected in its placid waters.

The Mountain Nile draws away the crystal water from this lake on its long northern journey to the Mediterranean Sea. Soon the stream tumbles down from the last mountain in a rapid and then is navigable to Khartum, over twelve hundred miles away.

Floating islands. At first the Mountain Nile (Fig. 191) expands into broad, steaming swamps, crowded with tangled masses of rotting grass and reeds. As we advance, the channel becomes narrower and narrower, until at last the way is entirely barred by dense masses of floating grasses bound compactly together by a green slime of decaying water weeds. This is the *Sudd*. Much of the mass floats down from marshes in the tributaries and collects in the sluggish current of the main stream, fed gently from Victoria and Albert Nyanza, the chief reservoirs of the river. So dense is this floating grassy raft that oxen and elephants can walk over it. Crocodiles and hippopotami sometimes become entrapped in its meshes and die before they can loose themselves from its tangling embrace.

We have to cut our way wearily through this tenacious Sudd. In seasons when heavy rains strengthen the current, the Sudd is swept downstream, and the channel may be kept clear for a few years, but gradually the clotted mass of green collects again to block the way.

The Nile's secret revealed. Now we have left the putrid Sudd behind and enter a part of the river bordered by forests of tall trees trimmed with festoons of beautifully coloured vines. Soon a great stream from the east pours torrents of turbid water into the main river. We have now reached the White Nile (Fig. 191). As we near the city of Khartum, the rich trees and grasses that decked its valley farther south have begun to disappear, and to be replaced by the harsh, leafless, spiny scrub of the desert. At Khartum a second great tributary from the east rolls in its flood of troubled, muddy water.

We are now on the last part of our trip. Lower down no stream flows in from the desert on the west, but on the east a strange stream is yet to join the main river. Yesterday it was a barren bed of baked clay and scorching sand. Along this blighted valley, winding across the yellow desert sands, no bush could boast a leaf, no tree could cast a shade. During the

night a distant rumble was heard, which drew nearer and became louder, until at last it was a mighty roar. In the morning a mass of water was hastening through the valley. No drop of rain had fallen, no cloud had weakened the rays of the burning Egyptian sun. The night had been almost as sultry as the day, and yet this mysterious branch of the Nile had filled with water, which was hastening down to raise the main stream above its banks.

The key to unlock this mystery lies away to the south-east in the highlands of Abyssinia, where this and other rivers emptying into the Nile from the east take their rise. Then in May and June the hot moist winds from the Atlantic, after blowing across Equatorial Africa, are deflected up the plateau. As they cool, rain pours in torrents and sheets day after day. The water collects into the parched river valleys and rushes down the western slopes, pouring muddy waters into the Nile and making it overflow its banks. For long centuries the secret source of this water, that fills the Nile to overflowing, was well kept.

The cradle of the first civilization. The river, which is still on the African plateau, now by means of a succession of rapids and falls, called the *cataracts*, cuts its way down to the lowlands. When the Nile is high these cataracts do not prevent boats from passing along this part of the river, but during the period from December to June, when the Nile is low, the rapids and falls cannot be traversed.

At Assuam, where the lowest cataract occurs, a great dam of granite has been built right across the river, which holds back the water when rains are abundant, and feeds it to the lower reaches of the river during the winter and spring when the water is low.

Below the dam large boats can run to the mouth of the river unhindered by rapid or shallow.

We have now entered Egypt. On every hand as we glide along we see ruins of massive temples and monuments, some of them almost seven thousand years old, built by the ancient Egyptians. On each side of the river is a low, flat flood plain, from two to three miles wide, bounded by a steep rocky cliff, and beyond this the drifting sands and scorched rock of the lonely Sahara.

The real Egypt is this narrow, winding strip of plain a few miles wide and seven hundred miles long. From an aeroplane it looks like a green snake winding across a plate of brass. Packed between the rocky cliffs is the densest farming population on the face of the earth. The land is lower than the level of the water and is protected from flooding by walls of mud. Each field is surrounded by a similar wall. As rain seldom falls, the fields

FIG. 190. CANADA AND AFRICA

Africa is how many times as large as Canada? Since the area of Canada is about 3,600,000 square miles, how large is Africa?

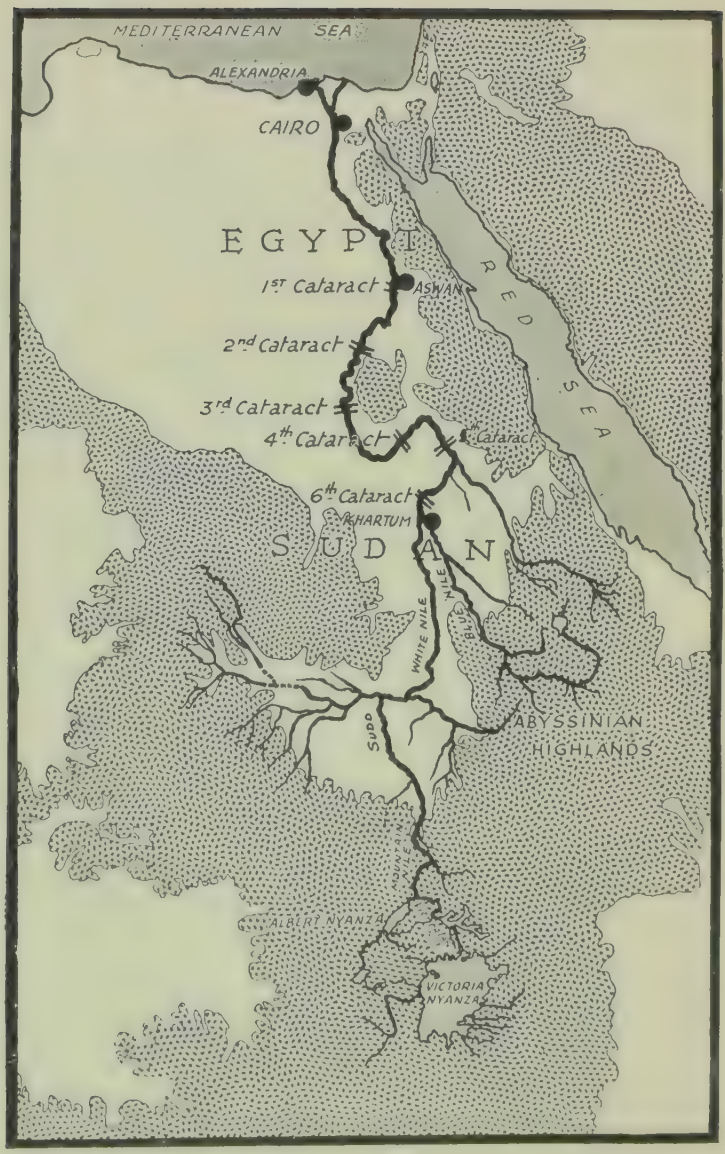


FIG. 101. THE MYSTERY RIVER OF AFRICA: THE NILE

The white part is lowland, the part tinted with coarse dots is highland. In what large lake does the Nile River rise? Under what names is it known from this lake to its mouth? How many tributaries flow in from the west? How many flow down from the Abyssinian Highlands? Why do none flow into it throughout its lower course? Into what body of water does it empty? How many cataracts has it? Are the highlands closer to it on the east or west?

are irrigated by allowing the muddy waters of the Nile to overflow. The mud fertilises the soil and the water gives moisture to the plants.

Three crops are grown during the year: wheat and barley during the winter, cotton and sugar-cane during the early summer, and rice and corn during the autumn. Before the Assuam dam was built little cotton and sugar-cane could be grown, as the water in May and June had sunk too low to flow over the fields.

At last we enter Cairo, the largest city in Africa. Its many high towers can be seen long before the city is reached. It is very unlike a Canadian city. The houses are usually white, and the people have dark skins, wear strange clothes, and talk in languages very different from our own. Though there are many beautiful buildings, there are also narrow, filthy streets, bordered by mean mud houses in which the native Egyptians live. Great swaying camels, laden with gums and dates from the oases and borders of the desert, jostle along the streets with long-eared donkeys. Huge, white, curved elephants' tusks and delicate, fluffy ostrich feathers from Central Africa, meet silks and shawls from Persia and India in the markets. In recent years, since England has greatly helped Egypt, the cottons, garments, and metal goods of Europe are also sold largely in its shops.

People of many kinds mingle in the streets. A humble farmer from the country, looking much as he did seven thousand years ago, makes bargains with an up-to-date shopkeeper; a tall, stately nomad from the desert walks along the street of the despised city with haughty dignity; a Jewish merchant and a Greek trader are both prospering as they drive hard bargains; an English traveller, an American tourist, and a French official give a Western touch to the scene.

The delta. But we hasten along. We are now in the delta of the river. The high cliffs on each side have disappeared, and a level plain, braided with branches of the river, stretches as far as the eye can see. Only two of these branches, however, are deep enough for ships, and we take the one to the left, and soon cool breezes from the Mediterranean Sea beat back the stifling desert air. The flooded fields of rice, the snowy whiteness of the cotton pods, and the silky tassels of the tall corn are seen everywhere, while villages of mud huts shoot past. Now we move along a narrow canal, and at last a great city is seen across the flat landscape. It is Alexandria, the capital of Egypt for over a thousand years. Even to-day it is the busiest port on the north coast of Africa, and its broad harbour swarms with ships flying many flags, but the Union Jack far outnumbers any other. This port is the throat of Egypt. Almost all the cloth and metal goods used in

the valley of the Nile pass across its wharves, and ships leave its harbour laden with cotton, rice, wheat, elephants' tusks, dates, ostrich feathers, gums, and many other products of field, forest, and desert.

Across the Greatest Desert

Over the Atlas Mountains. We land from our ship at the smart port of Oran, which we are surprised to find has big business blocks very much like those of Toronto or Vancouver. Though we are in Algeria, the French flag flying everywhere tells us that it is a colony of France, which lies just across the Mediterranean Sea.

Soon after we begin to climb the plateau to the south, beautiful landscape and fertile fields open below us. Well-kept gardens have trees laden with peaches and pears, and vines are heavy with clusters of luscious grapes. Oranges everywhere give a touch of colour to the greenery. Thick-leaved olive trees, with rough trunks and dusty branches, bear their grey, plum-like fruits. Fields of wheat and barley, which grow in the winter, supply food for man and beast. As we move farther south the plateau becomes higher, the temperature cooler, and water scarcer. Here the dark-skinned natives pasture their sheep, camels, and goats on the spiny shrubs and harsh, leathery herbage. When we reach the crest of the Atlas Mountains a new world meets our eyes. To the north are lush fruit trees, smiling green fields, numerous herds, and little mud houses like white specks; to the south a dreary sea of sandy plains, and barren, rocky hills, boundless, colourless, noiseless.

Across the desert. Now we are about to launch out on the vast spaces of the Sahara, the largest desert in the world. Over its face are tracks beaten flat by the traffic of ages, and along these lonely highways pass many camel caravans, exhausted by the dazzling, brassy glare of sun and sand. Human skeletons, polished white by the sand-blast of the desert, are strewn along these paths. Robbers, fearful sand-storms, starvation, and thirst lay low many a traveller.

The ship of the desert. The Sahara would have been an unknown land but for the camel, for this animal is well suited to desert life. His dull, brown colour protects him from his enemies, his horny mouth and lips allow him to eat the spiny-stemmed, leathery-leaved plants of the desert. His long neck assists him in seeing great distances, and also allows him as he travels to crop the scanty twigs over a wide strip on each side of the path, while the high arch over his eye protects him from the steady glare of the sun. But most wonderful of all is his stomach, which, besides

By courtesy of H. L. Shantz, Department of Agriculture, Washington, D.C.

FIG. 192. A CITY WITH A MILLION INHABITANTS

A white ant, or termite, colony. It is ten feet high, made of earth and wood, and the interior has many layers separated by [illegible] even wooden houses.

By courtesy of H. L. Shantz, Department of Agriculture, Washington, D.C.

FIG. 103. FRUIT MARKET IN ZANZIBAR

Find Zanzibar on the map of Africa. Name two kinds of fruit and one kind of nut shown in the picture. The long cylindrical objects piled on the mat are cassava, the fleshy roots of a plant from which tapioca is obtained.

By courtesy of South African Railways.

FIG. 194. GOOD-MORNING! THIS IS A VERY SLIPPERY WORLD!

An ostrich's nest. Notice the mound of sand with the eggs in a hollow on top of it. How many eggs are there? How large are they? Find an egg that is chipping. Is the land fertile?

By courtesy of South African Railways.

FIG. 195. A SOUTH AFRICAN STOCK FARM

How large are the ostriches? What parts have no feathers? What parts are white? What is the character of the surface of the country? Are there many trees? How are the ostriches kept from wandering?

By courtesy of H. L. Shantz, Department of Agriculture, Washington, D.C.

FIG. 196. A FREIGHT TRAIN IN CENTRAL AFRICA

Through [illegible] of Africa there are no roads and all goods are carried along narrow paths by porters. How many tins of gasoline are they carrying? To what race do they belong? Describe their dress.

By courtesy of Canadian Department, Zanzibar.

FIG. 197. COASTING ALONG EAST AFRICA

A native sailing-vessel. How does it differ from a Canadian sailing-vessel?

food, can hold over a hundred pints of water, stowed away in a number of cells like honey in the comb. On his back are one or two lumps of fat, called humps, which act as food store-houses. On account of its hump and water-sacs, a camel can travel over the scorching sands under a blazing sun for several days without food or drink, and at the same time its milk is sufficient to feed one person as well as its young.

The caravan. Across the desert we went, but not alone. Hundreds of camels, loaded with goods to trade with the wild Berber tribes living in the desert and with the negroes in the Sudan to the south, marched in single file. Tall, black-haired Arabs on the backs of the camels, or by their sides, carried rifles to protect the caravan from robbers, who lurk in lonesome places behind ridges of sand or in rocky clefts.

Over sand and rocks. Our journey was first over a sea of yellow sand, built up into hills by the wind. During the first few hours there were scattered thorn bushes from which gum arabic is obtained. These soon became fewer and smaller, then entirely disappeared. Later on, only scattered, dwarf, scrubby bushes struggled desperately for life in the fiery sand.

During the day the heat was so intense that no cloud or moisture in the air withstood the burning heat of the sun's rays, and the hot sand was unbearable to the touch. But when the sun went down, the sand flung back its heat into the sky and became unpleasantly cold.

A little paradise in the desert. After watching the dryness, barrenness, and brownness of the desert for two trying, dreary days, a speck on the horizon caught our tired gaze. Was it an animal? No, it did not move. As hours of jerky swaying on the camel's back slowly passed, the speck became larger and larger. The camels put more spirit into their march as they sniffed the air with their nostrils. The speck began to take form and soon had a shade of green. At last we were near enough to get a sniff of the odour of flowers. What a lovely scent! Now we were in an avenue of graceful palm trees, sweet grass of an emerald green covered small fields, and little, flat-roofed mud houses peeped out from behind fruit trees.

This was an *oasis* in the desert. The rain that fell on the Atlas Mountains in Algeria (Map 55 in Atlas), three hundred miles away, sank into the porous rock and filtered underground until it found an opening, through which it poured out its limpid stream as a spring, giving life and greenness to the dead desert. By boring holes, many flowing wells were formed, which enlarged the oasis many times. Dates, olives, oranges, and lemons are grown, and wheat and barley in the fields. We learn that thousands of these oases are scattered over the Sahara, and many more have been formed by

simply digging wells, often only a few feet in depth. Some day these sandy wastes, covering an area as large as Ontario, may be thickly dotted with these islands of green, each containing villages of contented peasants.

The rocky desert. Soon after leaving this oasis the cruel sands were passed and we reached a rocky part of the desert. We marched some hours over crisp gravel and rattling boulders, then great platforms of red and yellow rock stretched out before us, and travelling became more difficult. The thick pads on the feet of the camels, which spurned the hot sand, were cracked and cut by sharp rock. Great ravines gaped before us as we proceeded, and river-beds, which told plainly that once this was a well-watered country, now were empty and dry across our path.

A city in the desert. After weary days and tired nights, at last came signs that our caravan was approaching a settlement. We caught sight of distant lines of camels creeping along like flies on a plate of brass, all going toward a distant point that could be seen in the south. This point became a group of houses as we advanced, and by nightfall we were in the historic city of Timbuktu. Nowhere else does such a city exist. There it stands, throbbing with life and sound, and the dead, voiceless desert on every side. Not even a trickling stream relieves the drought. Here shrewd traders from Egypt and Arabia on the east, and from Morocco and Tunis on the north, meet barbarous negroes from the interior and highly-civilized Hausas from Nigeria. Nowhere in Africa do such strange varieties of people meet. Great, swaying, ugly-tempered camels, still carrying their loads and exhausted from the desert trip, jostle in the narrow streets with the motley crowd.

To the north of Timbuktu lies the barren, rainless desert, to the south, the most productive part of Africa. The abundant rains and tropical heat quicken Nature, and cotton, coffee, cereals, fruits, and nuts grow abundantly either in the fields or in the forests. Long lines of negroes, with these products on their heads, march through narrow, leafy tunnels in the dense forests toward Timbuktu. Others from both east and west guide their ships along the Niger River to the same trading post. The native goods are exchanged for dates, perfumes, gums, and other products brought in from the desert, and also for manufactured goods from the Mediterranean coast.

Although Timbuktu does not rest on the Niger River, it is so close to it that great stretches of navigable water on this wonderful river have greatly aided the growth of the city.

All aboard on the Niger. We decide to reach the coast by sailing down the Niger River. At first the stream is broad and deep with no rapids, but

By courtesy of Tunis Government.

FIG. 198. HIGH-SPEED PLOUGHING IN NORTH AFRICA

Describe the plough. What animal is used? What is the person in front doing? Describe the olive trees.

By courtesy of Governor of Morocco.

FIG. 199. A TOWN BUILT OF MUD

This is a town in an oasis in the Sahara Desert. How wide is the street? What shape are the doors opening on the street? How close together are the houses? Of what are the walls and roof made? How thick are the walls? What shape are the windows? Have they glass in them? What shape is the roof? Notice the projecting ends of the poles supporting the roof. Do you think roofs shed rain well? Why are the roofs built in that way? Why are the houses painted? Why? Find a man on a roof. Find two streets. What kind of trees are beyond the town?

By courtesy of Governor of Morocco.

FIG. 200. AN OASIS IN THE DESERT OF MOROCCO

How tall are the date-palm trees? How long are the leaves? Are there any other kinds of trees? Describe the dress of the man. What is the colour of his skin?

beyond the narrow cultivated strip on each side of the river there is still only the unfriendly desert, which has frowned on us for weeks.

In time, as we reach lower levels, where there is a rainy season, the bareness of the land is replaced by harsh spiny shrubs and coarse grass, in which are pastured sheep and goats. As we advance farther the grass becomes more luscious, and leathery-leaved, spiny-stemmed growths disappear before the increasing moisture.

At last we reach Nigeria, the most densely populated and highly civilized of all the native African states. As we drop down from one level to another by means of falls and rapids, we soon reach the tropical rain forest. Villages peep cosily from the protecting shadow of its depths. Children, naked as on the day they were born, dive and swim near the edge of the wide stream. Crocodiles lie like stranded logs in the quiet margins. The forest itself is charming both in colour and form, and many shades of green are beautifully stained with contrasting masses of scarlet, yellow, and purple blossoms. Giant mahogany, growths of untold value (Fig. 215), are interlocked with graceful cotton trees; the delicate, feathery leaves of the oil palm and the still more dainty raffia, blend with these giant trees to give exquisite forms.

The mangrove swamps. We are now in the great delta, which spreads its treacherous branches a hundred miles along the coast. The beautiful forest is replaced by coarse mangrove trees that stretch out their aerial roots in every direction. From the steamer it looks beautiful, but in reality it is as repulsive as any region on the face of the earth. Here is nothing but slippery mud grasping at the roots of the mangrove, and the air is putrid with odours of steaming muck and slimy, rotting plants. A man finds it almost impossible to live in this region. If he tried to penetrate the unhealthy gloom, tangled bush would meet him at every turn. Millions of mosquitoes, disturbed in their foul abode, would settle on him and drive him crazy with their blood-sucking attacks. The few tribes that live in this sickening air are unwashed, barbarous cannibals. Even wild beasts seem to avoid its reeking loathsomeness, and only the hoarse shriek of a gaily-coloured parrot, or the bark of a monkey, pierces the gloom.

A forbidding coast. We are glad to escape from the mangrove swamps and to sniff in air from the sea as we reach the main mouth of the great river. But the sea looks forbidding. For fifteen hundred miles there is not a single harbour along the coast, and the waves are ever a wonder and a danger. The surface is never dead calm. The breeze from the sea ruffles it during the day and the breeze from the land during the night. Ships anchored one or two miles from the shore, which is as near as they can

approach, are for ever rocking uneasily as they are loaded or unloaded. Just as unceasingly the long waves rolling forward gather strength and height as they advance, and meeting the ebbing water from preceding waves, coil, roll, and at once the long line of water is thrown with a furious roar against the beach. If it strikes a rock, a great fountain of spray and foam breaks the continuous line. The small European boat that dares to pass through these breakers is flooded with the first wave. Only craft with arched bottoms, especially constructed for the purpose, can ride successfully this dangerous surf.

GEOGRAPHICAL PEPPER AND SALT

Interest facts: not to be memorized.

Zanzibar, a British possession on the east coast of Africa, supplies the world with most of its cloves, but the best come from Penang in the Malay Peninsula.

If the world's annual production of gold was made into bricks, every third one would come from South Africa.

One half of all the chocolates eaten and of all the cocoa drunk is obtained from cacao trees grown in Gold Coast, a British possession in West Africa.

It is not generally known that the Belgian Congo has more than twice as great water-power as any other country; scarcely any of it is developed.

FIG. 201. ACRES OF CLOVES

This scene is from Zanzibar, which should be found on the map of Africa. On what are the cloves spread to dry? How do the people turn them? Of what race are the people? Describe their clothes. What covers the roof of the shed?

By courtesy of Government of Tunis.

FIG. 202. TEACHING SCHOOL-CHILDREN IN NORTH AFRICA

What do the pupils take off instead of their hats when they enter the schoolroom? With what is the floor covered? Notice the differences between this and a Canadian schoolroom.

CHAPTER XVII

TALES OF JOHN BULL'S FAMILY

THE STORY OF THE BRITISH EMPIRE

Rumours had come down to the settled country that a new goldfield had been discovered in Northern British Columbia, and the news caused excitement in the most distant parts of the British Empire. Men sold their houses, mortgaged their farms, borrowed money from their relations, and even sold clothes, jewels, and watches in order to join in the feverish rush to the goldfields.

The centre of their hopes lay far from the beaten paths. Rivers had to be traversed in canoes against treacherous currents and baffling rapids, deep-yawning ravines had to be crossed, and rough plateaus with heart-breaking ridges and swampy valleys had to be conquered before the creek gravels with their yellow nuggets came in sight. Men from all parts of the earth pushed forward along the whole route to the beckoning gleam of gold. Many fell by the wayside exhausted and starving, some were drowned in the cruel currents of the mountain torrents, thousands turned back, and only the most brawny and dogged had reached a clearing by a stream within two days of the mining camp.

Seven men were gathered round the bright camp-fire, whose sparks shot up almost to the tree-tops. Though their clothes were in tatters, their boots almost gone, and their hairy faces brown and haggard, all were in high spirits, since before the week was out they would be washing the gravel through the sieves, and some might find in the bottom of the pan yellow nuggets which would make them suddenly rich.

The natural leader was, to judge by his accent, an Englishman. As there came a lull, each thinking of the day after to-morrow, the leader suggested that as they would soon be scattered, and as the evening was still young, each should tell the story of the country from which he came, and the others should endeavour from each story to guess the name of the country from which the speaker came. The idea pleased them all, and these are the stories which they told.

The Shepherd's Tale

The country of sheep and rabbits. I've come from as far as any man can come. My country is a continent and the largest island in the ocean, and my home was once the land of gold, but now may be more fittingly called the land of the golden fleece. Both our greatest blessing and our blackest curse are animals which the early settlers brought into our land. The sheep (Fig. 203) is the blessing and the rabbit (Fig. 204) is the curse. Over half of the people of my country are packed into five cities, each the capital of a state. There are few villages. Although my country has less than two-thirds of the population of Canada, two of my cities, Sydney and Melbourne, are much larger than your largest city, Montreal. My country has the strangest capital, which is called Canberra, with little or no population, no railway, and few buildings. As yet it is not used for governing purposes. Some of our habits of life would seem strange to you. The sun shines to the north of us, not to the south, and sun rooms are built on the north instead of the south side of our houses. In December and January we flee away from the burning, thirsty heat of the cities to our summer homes in the mountains, or south into Tasmania and New Zealand.

Can you guess the name?

A fertile strip. Our country can be divided into three regions. The first is a narrow plain along the eastern coast, where the trade-winds (Maps 3 and 4 in the Atlas) blowing in from the Pacific Ocean bring abundant rain, clothing its surface in a mantle of Irish green. In the north of this belt in Queensland all tropical products grow like weeds. Bananas in immense bunches, broad fields of cotton, and miles of sugar-cane block out the coastal lands. Farther south oranges and lemons ripen as well as in Florida, while in the south-eastern corner wheat, grapes, apples, peaches, and many other fruits come to perfection.

From grass to salt-bush. Behind the coastal belt is the main range of mountains, which runs from north to south. Wide plains, both east and west, run like a green sea to the base of the mountains, which rise dark and splendid against the sky. The plain, west of the Dividing Range as it is called, stretches for a thousand miles, and in a part of this near the mountains the rainfall is sufficient to make good pasturage for the world's largest flocks of sheep. As one advances westward, however, the pasture lands become drier and drier. Trees disappear, and harsh, spiny acacias take their place. The juicy grasses of the eastern coast give way to dull salt-bush with smooth, light-green leaves and salty taste. Long

By courtesy of Government of New South Wales.

FIG. 203. FAT SHEEP READY FOR MARKET

Have the sheep horns? How will they be loaded on to the cars? Is this a city or country scene? What evidence is there that the land is not very fertile?

By courtesy of Australian Government.

FIG. 204. A PEST MADE PROFITABLE

A load of rabbits being brought to a freezing station. When frozen they are shipped to foreign countries. Many come to Canada. How are they packed on the wagon? About how many rabbits are on the load?

after the last shred of grass has turned to dust, this bush still stands erect to save millions of sheep from starvation.

Rabbits, rabbits, and still more rabbits. But even in these sparse pastures of salt-bush, where every sheep requires a square mile in order to live, the flocks are not left in peace. Tame rabbits that were set free, or escaped from the early settlers, have multiplied like flies, and have spread themselves everywhere over the lean pastures to rob the sheep of their food. They are my country's greatest curse. In spite of wire fences thousands of miles in length, in spite of poison, traps, dogs, guns, stoats, weasels, ferrets, cats, and many other instruments of death, the meek rabbit, without means of defence, is too powerful for man's puny hand.

A land of suffering and death. At last as we advance westward we get beyond the spiny scrub and lonely bush into the hottest, barest desert on the face of the earth. It covers over half of my country, and in the south and west is lapped by the sea for a thousand miles. The whole surface for many thousands of square miles is seamed with cracks as though the earth were opening her mouth and panting for water, but no water comes. Over this fearful desert sunrise comes with a fiery red glow, and a scorching wind sweeps across the sun-baked land, smothering everything with dust and grit. Though this land, where the drought king holds sway, is a land of suffering and death, brave explorers have faced its dangers. They describe the heat of noon as being so intense that the screws holding together their boxes dropped out, the teeth of their combs split into thin layers, the lead came out of their lead pencils, the hair of their heads ceased to grow, and their finger-nails became as brittle as glass.

The hated spinifex. But even this fiery furnace has its vegetation rooted deep in the burning sands. But what a plant! Great, dull-looking mounds all covered with dust look like a mass of harmless, projecting rocks. But let man or beast brush against the dreaded spinifex, for such it is, and its torturing leaves, with their sharp, rigid spines, inflict painful wounds.

Water spouting from the desert. Who would suspect that even this desert, so dry and barren, has lying under many parts of its dreaded surface abundance of water? Over thousands of square miles, millions of gallons of clear water spurt out of holes bored through the hot crust. In many parts the water can be got a few feet below the surface, in others it is much deeper. Already these artesian wells have been the means of bringing thousands of square miles under pasturage, and as a result of irrigation great areas of the driest desert may be changed to green orchards and grain fields.

The desert retreats before man. My country is proud to be a com-

monwealth in the British Empire, my people are almost all British by birth, and our motto is progress and prosperity. Though our population is less than six millions, our sheep are unequalled in numbers and quality; gold, silver, lead, zinc, tin, and coal are mined in many parts; and in wheat production we are surpassed in the Southern Hemisphere only by Argentina. Though much of my country is marked desert on maps, the real desert is shrinking every year before the marvellous work of man. Artesian wells have cut off thousands of square miles from the desert and made them into pasture fields; in the region of the Murray and Darling Rivers and their tributaries, great stretches of what was a scowling, scorched desert are now a smiling plain with broad fields of wheat (Fig. 205), groves of fragrant orange trees, and green trellises, groaning beneath the weight of luscious grapes. As the country is more completely explored, many regions marked sandy desert are found to be so high that they catch rain and will be splendid pastures when railways make them more easily reached. No country in the Empire has a greater future than this vast southern continent.

The Tin-miner's Tale

The man who takes things easy. I am neither white nor black, but a little brown man. I come from the south-east of Asia in the Malay Peninsula, and I too am proud to call George V. my king.

The rains pour down throughout the summer on my sultry land. My people are a mixture of brown Malays and yellow Chinamen. The Malays take life easily. Each family floods a few acres, hacks down the weeds, sticks seedling rice plants into the mud amongst the rotting leaves without ploughing or harrowing the soil, and the man of the house then sits on the top step of the ladder leading from the field to the raised house, and lazily smokes the pipe of peace and contentment, waiting for the rice to grow. But he does not live on rice alone. Near the house is a patch of bread-fruit, bananas, pine-apples, and a dozen other fruits that you know nothing about. As these ripen at different seasons they furnish a plentiful supply of food throughout the year. The rice is often neither tilled nor weeded. When it is ripe it is cut, but not with a binder. The Malay farmer cuts off the heads one by one with a knife, separates the grain from the chaff by pounding, and stores the paddy, as the rice grains are called, under the house. This rice, with the fruits, keeps the Malay's family well fed; a little rice is exchanged for a few yards of cotton, which will scantily clothe the grown-ups, and the children go naked. Bamboo poles, banana and

Fig. 205. Ploughing on a Large Scale

How many ploughs can be seen? Describe the ploughs. How many horses pull each plough? Find the overseer. Describe the surface of the country. Wheat is grown on this land.

By courtesy of Malay State Information Agency.

FIG. 206. WHERE THE SHINE ON THE KETTLE COMES FROM

A tin mine in Malay. Where do they get the pigment? How is it transported? What kind of

By courtesy of Malay State Information Agency.

FIG. 207. AUTO TIRES FROM A RUBBER TREE

Tapping rubber trees in Malay. How large is the tree? Describe how it is tapped. In what is the liquid caught? Describe the costume of the tapper.

other leaves, and reeds hastily cut from the jungle, can be thrown together to make a house in a few hours. Such is life in the hot, wet lands.

The man who counts. But the Chinese coolie's life is another matter. If a monument were erected in Malaya to the man who deserves most, it would not be to the British planter, or the easy-going Malay, but to the grimy, sweating coolies who have come from China to live in this country. The railways, the roads, the vast rubber plantations, the towns and cities are all monuments to their patient toil. They are the workers in this human beehive. In the hot, muggy air, under a withering sun, these little men work patiently on from dawn till darkness, with the sweat streaming from their almost naked bodies. Some can be seen bowed beneath two baskets of tin sand balanced on the ends of a pole over their shoulders. Although you could hardly lift one of the baskets, the Chinese coolie will carry the two twenty-five miles in a day. Others are busy cutting down the jungle, burning the trees and stumps, and planting rubber trees to form a plantation. The Chinese coolie also plants the coco-nuts, climbs the tall trees to cut down the nut when ripe, pulls the rough husk from it in a minute, though it would take you almost an hour, and with one whack opens the nut to allow the flesh to be exposed to the sun in order that it may dry and form copra, one of the chief products of the country. He patiently carries in baskets the gravel to make the roads and to ballast the railroad, he cares for the beautiful gardens seen all over the land, and his patient magic touch makes more grow in one acre than you in Canada could grow in five.

The world obtains more than half of its tin from this country. The tin sand, which is mixed with the soil, is dug by the Chinese coolies with hoes, spades, or any tools which they can find, the earth is washed away with water, and the heavier tin sand is left behind. It is packed in sacks, carried by the coolies to the nearest station, and shipped to Singapore to be smelted into silvery, white tin.

My country, Malaya, is composed of the Malay States and the Straits Settlements.

The Boer's Tale

A dull, drab land. I come from a far-away land in the south of Africa, the Dark Continent. Of the seven million people in my country, four-fifths are black natives, and the rest are either English or Dutch. The English live chiefly in the cities and towns, but the Dutch, called Boers, love the lonely places, and live on their large, lean farms miles apart on the highlands, which form the greater part of the country.

My native state is above all a dry land; except for a short season it is parched and thirsty, and instead of clear brooks murmuring through green meadows, the water-courses are bone dry, and both mountains and plains are iron hard, a pale empty brown in colour, with no motion but that of dancing whirls of grey dust. The monotonous stretches of sad-looking veld are broken by clumps of miserable brown grass and harsh shrubs, both of which bristle with spines and thorns. The sheep, cattle, and goats, which are the chief wealth of the farmers, find scanty fare on these rough plants. Few are the favoured spots in which a forest can be seen, and even single trees are scattered enough to be objects of notice. But all is not dull, for during the dry season, which lasts for the greater part of the year, it is a land of brilliant sun and keen, dry air.

Rain's magic wand. In the summer, before the rains, it becomes very hot, and a pitiless sun mocks the dry earth from a brass-bound sky. At last the rains come, but not as in your country. Whereas in Canada you receive your rain distributed through the twelve months, we have more fantastic tastes, enjoying either a feast or a famine; so we crowd our rains into a few days or weeks, and then give ourselves up to sunshine and dryness for the rest of the year. Further, our rains are not ordinary showers, but torrential storms, that lash the land with their fury and are gone. But what a magical touch they have! The dusty river-channel becomes a raging flood, and the whole land changes as though a giant painter, with all the greens, had retouched it boldly. Every foot of sand is broken open by small flowering lilies and waxy blossoms. Grey bushes and tufts of ghostly, withered grass become green, juicy, and dainty to the taste of sheep and cattle, and to ears grown used for months to the dry rustle of the drought, the tinkle of the water is sweet music. The veld rejoices and claps its hands, for the strain of the drought on the stock has been dreadful, but now the animals will have luscious pasturage, and the lonely Boer farmer is glad. But the rains are soon past, a steady sun shining through dry air again rules the scene, and gradually thirst and hunger resume their sway over the land.

A child plays with a wonderful stone. You may wonder why so many English were attracted to this drab land, but it contains some of the most precious of the world's possessions. One day long ago a traveller found a child playing with a strange stone. He offered to buy it from the boy's father, but the latter laughed at his stupidity in wanting to buy a small stone that was worth nothing, and gave it to him. He showed it to different merchants, who laughed at the idea of it being a diamond. Then the man showed that it would cut glass, yet he was still laughed at. He

By courtesy of Department of Education, Zanzibar.

FIG. 208. A HOUSE BUILT LIKE A BASKET

This is a partially built house in Zanzibar. Find Zanzibar on the map of Africa. (Map 58 in Atlas.) To what country does it belong? Of what is the framework of the house built? How are the parts fastened together? With what material do they cover the framework? How large is the house? Of what race are the people? Describe their dress.

By courtesy of South African Railways.

FIG. 209. A HOUSE LIKE A BEEHIVE

The home or kraal of natives of Natal. Find Natal on the map of Africa. (Map 59 in Atlas.) To what race do the people belong? What kind of hair have they? With what is their oval kraal covered? Find the opening. Are the natives of Zanzibar or those of Natal more highly civilized? Give evidence from the two pictures on this page to support your view.

By courtesy of Commissioner of South Africa.

FIG. 210. GOLD IS TAKEN FROM THE ROCK

A mine at Johannesburg. Find the pile of waste rock. What is the use of the tanks?

once lost it, and at last he sent it to Capetown to have it tested. The Governor bought it for two thousand five hundred dollars, and the traveller sent half of this money to the father who had laughed at him.

A round hole containing a billion. That was the beginning. A wild rush soon filled the country with eager diamond hunters, but the chief mines were found in a circular patch of blue earth on the open veld. Soon around this magic circle a village sprang up, called Kimberley, and nearly the whole of the world's supply of diamonds now comes from these mines.

The city of gold. But my country has a greater wonder than its diamond mines. Get on a train with me at Capetown, my country's oldest and most noted city, and let us ride over the monotonous veld. We pass scattered villages and many a Boer's home, miles from his nearest neighbour. At last we pass through the centre of diamond mining at Kimberley, and then speed to the north-east. After a long and dreary ride, we know that we are nearing a great city; houses become more numerous, and many motor-cars speed over the dusty roads. Then we draw up at Johannesburg (Fig. 210). Though this city is only forty years old, it is by far the largest in South Africa, and its up-to-date buildings and broad streets compare well with those of Winnipeg or Vancouver. One wonders why men ever set down this hustling city in such a forbidding and desolate place. The earth is barren, the plants are grey, stunted, and thorny, and frequent sand-storms spread their dusty covering over everything like a pall. What are those immense dull-looking piles running in a line as far as the eyes can reach? What are those ugly-looking derricks in line with the piles? Above all, what is this deafening noise that beats against one's ears day and night? Those piles are the foundations of the city, those derricks its arms, and those dreadful sounds its heart-beats.

Stretching along that line for sixty miles is the world's greatest gold-field. It is the Rand. Thick layers of rock, tipped up on edge, run down slantingly into the earth, looking as though they were formed from a shingly shore in which all the stones were glued together. There is not a sign of yellow on their surfaces, nevertheless they contain the gold that has made Johannesburg and South Africa. These sloping rocks have been traced more than a mile into the earth. The deafening noise is caused by the machines that are pounding the rocks to dust, and the great piles are the refuse dust after the gold has been extracted. Almost half of the world's supply of gold comes yearly from these reefs.

Farming feathers. My country has many surprises. There are great live-stock farms, but instead of cattle and sheep, dignified black and white ostriches strut through the fields (Figs. 194, 195), and instead of

the farmer selling milk and meat, he puts on the market expensive ostrich feathers.

Oranges, lemons, grapes, pine-apples, cotton, corn, even tea and coffee, are grown in the moister parts of my country.

Once we fought fiercely against Great Britain, but when we were defeated she was so generous and trustful that she won our hearts, and now we are proud to be a part of the British Empire.

The Dairyman's Tale

A romantic coast. My island home is a land of progress and plenty, situated eleven hundred miles south-east of Australia. The seas around are deep blue, wind-stirred, sometimes stern with flecks of foam, but usually flashing with brilliant sunshine. The west coast is like that of British Columbia; inlets deep and calm succeed one another along the coast and pierce far into the steep and towering mountains, which are often capped with snow and seamed with glittering ice. Mantling the lower slopes is a dense tangle of almost tropical forest, whose foliage is kept fresh and vivid green by frequent rains and gentle mists. Everywhere on this rough coast white torrents streak the stern mountain-side, and plunging down, resound through the stillness of the great trees. Behind are mountain peaks clad in snow and ice, feeding many glaciers.

The world's best butter. But my island home has a very different eastern side. Here the mountains fall away into plains of varying width along the coast, and here the population is greatest. Broad sheep ranches creep up the sides of the mountains, and well-cultivated farms cover the plains. Choice dairy herds are the pride of my country, and our immense creameries make butter so choice and sweet that even after we have shipped it to England, almost on the opposite side of the world, it rivals the best that is freshly produced in Denmark, Holland, and Ireland. Even Canada is glad to take some of this delicious product.

The bewitching island. My country consists of the North and South Islands, as well as many smaller ones, and it is chiefly the South Island that I have been describing. The North Island is one of the wonders of the world. Its climate and plants are almost tropical, and great volcanic cones tower to the sky in majestic grandeur. The dense tangle that clothes them with green rises bank above bank and tier upon tier, until the upper festoons of leafy masses seem to be held up by a magic hand. Volcanic fires shoot out here and there, geysers burst from the ground, sending up towering clouds of steam for hours at a time. Springs of boiling water, in

By courtesy of United Fruit Company.

FIG. 211. A STUDY IN YELLOW, GREEN AND BLACK

Shipping bananas in the West Indies. To what race do the workmen belong? What two methods of transportation are shown in the picture? How high is the banana plant? Where does the branch of bananas grow? In what direction do the bananas point when on the tree? How large are the leaves? How are they arranged on the stem?

By courtesy of Bermuda Trade Commissioner.

FIG. 212. WHERE THE EASTER LILIES BLOOM

Bermuda with its mild winter climate grows immense quantities of Easter lilies for the American trade.

which a man can cook his dinner, bubble up in thousands. Beautiful blue lakes fill the craters of former volcanoes, and hot fountains of water spurting up around them remind us of the hidden fires that still smoulder below.

Mining for gum. This bewitching island is still covered in patches by splendid kauri pine trees, and from their lofty roof and spreading branches to the rocks beneath the air is all vital with the odour of resin. It distils from the leaves, collects in big lumps in the forks, oozes from the branches, and even blends with the earth beneath your feet. Indeed, the mining of kauri gum from the earth, which once was covered by these forests, is still an important industry in the North Island.

We are happy, contented, and prosperous, form a Dominion in the great British Empire similar to Canada, and our future is bright with hope.

The Banana-grower's Tale

A tropical island. I came from the largest British island in the West Indies. My island home, shaped like a turtle, has its blue peaks rising over a mile above the surface of the ocean. More than one hundred streams tumble down from the mountains through deep ravines, finally to run across a narrow plain to the Caribbean Sea. At the two rainy seasons in May and October these streams are rushing torrents, but at no part of the year are they of much use for navigation. The chief charm of my island is its beautiful and varied climate. Even at the coast it is seldom very hot, and a man can have almost any climate he wishes according to the height at which he settles.

Our chief glory is vegetation. Noble trees, gay with showy flowers, feathery ferns of all shapes and sizes, gigantic water-lilies, with leaves as large as tables, are blended in the grandest profusion. But the chief wealth of the island is its fruits; bananas, oranges, grape-fruits, pine-apples, cocoanuts, and a dozen others hardly known in Canada grow in our gardens; ginger, pepper, allspice, coffee, and cocoa are cultivated in plantations; and mahogany, ebony, and logwood are cut in the forests.

Canada's little brother. A few thousand whites and seven hundred thousand negroes make up our population. Earthquakes and terrible cyclones have destroyed our crops and even our houses and towns more than once, many hard times have we had, but now we are on the sure road to progress. We look upon Canada as our big brother, since Great Britain is the mother of us both.

The Black Man's Tale

Negroes and nuts. I speak for the people of the British Empire in West Africa. Our possessions increase in size from west to east; Gambia is a narrow fringe around the lower course of the Gambia River, Sierra Leone is larger, Gold Coast and the territory to the north of it is still larger, and Nigeria is the largest; it is also the most populous of all the British possessions except India and has great resources. In all of these territories the landscape shows a line of white surf, a ribbon of yellow sand, and a wall of dark forest. This forest, two hundred and fifty miles wide, is cut through by many broad streams which spread out in unhealthy deltas all along the coast. In many parts the forests are impassable except by means of these streams, and no man can stand the hot, humid climate, reeking with disease, except black savages so uncivilized that they do not hesitate to eat their fellow-men.

From these forests are obtained some of the chief products of the country. Palm nuts in great bunches are nipped from the tops of tall trees and carried to the villages, where they are husked by the women. These husks are pounded and boiled in water until the oil is melted out of them and floats on the surface. The nut itself is broken and the dried kernels are shipped to Great Britain, where oil is extracted from them and the remainder fed to stock. Thus palm oil and palm kernels are obtained from the same nut. Another nut, to which is attributed almost magical power is the cola-nut, collected from the forests of the western states and imported into Nigeria. These nuts are chewed by the natives in order to withstand hunger, thirst, sleep, and fatigue. They are largely exported to Europe also, to be mixed with chocolate. From these forests are cut great logs of mahogany, which are brought down to the sea, cut into boards, and shipped to Great Britain and Canada.

Unequal war with weeds. The clearing of these forests for farming is a heart-breaking task. The intensely humid heat, heavy rains, and fat, black earth stimulate such rapid growth that a cleared field, unattended for a week, becomes a jungle. Farming thus becomes an unending fight with weeds. However, where such land is tilled, plants grow like mushrooms, and farming is making rapid strides under British guidance. For example, a few years ago practically no cocoa was grown, and now the Gold Coast alone supplies half the world. The growth of pea-nuts, usually called ground-nuts, is also increasing very rapidly, especially in Gambia.

High-class negroes. As one goes farther inland the levels become higher, the rainfall less, and the forests more open. Trees are replaced by

By courtesy of Commissioner of South Africa.

FIG. 213. HAVING A BATH IN SOUTH AFRICA

What animals are shown? How many of them are seen? Describe the grass. This is the Kgaleti River in Transvaal.

By courtesy of Director of Education, Gold Coast.

FIG. 214. MAKING COTTON CLOTH IN BRITISH WEST AFRICA

What is the woman doing? Describe the weaving loom. Notice how the man uses his toes. Notice the large tree behind them. What clothing do they wear?

grass, and still farther inland the grass gives place to such mean growth as spiny acacias, and fertile soil becomes desert sand.

In these higher lands are found superior types of negroes, who live in great cities whose streets are lined with mud houses surrounded by walls. They have great flocks of cattle, grow excellent cotton, and until recently wove on hand-looms strong textiles that clothed the natives of the whole Sahara region. It is in Northern Nigeria that a special effort is being made to grow cotton in such quantities that Great Britain will not depend on foreign countries for her supplies.

But it is not for products of the farm and forest alone that my land is valuable to the British Empire; tin mines have sent their shining metal to the mills of England for many years, and quite recently the coal mines of the same country have grown so rapidly that to-day they supply fuel for all the railways and boats along the Guinea Coast. Gold is still mined in the territory north of the Gold Coast, and other minerals no doubt will be drilled from the rugged rocks when more roads and railways open the arms of my country to receive the white man.

Nigerians and Canadians. Nigeria should be of special interest to Canadians and to the other countries of North America. The forefathers of the negroes whom you see upon your streets were, two hundred years ago, torn from their homes and families in my country by cruel Arab raiders and shipped across the ocean to be sold as slaves to work on the plantations in the Southern United States and the West Indies. If you came to my country you could still see coloured men tramping through the forests, paddling along the rivers, and working in the fields, whose fuzzy hair, thick lips, big white eyes, black faces, and light-hearted, lazy manner would at once remind you of the coloured men you see upon your streets.

The Sikh's Tale

The muffled tread of countless men. My country swarms with life. Though only half as large as Canada, three out of every four of the subjects of King George V. are huddled within the towns and villages of this wonderful land. Men, women, and children crowd everywhere, and the narrow streets of the towns are filled from wall to wall with sad-faced men jostling one another. From many a walled city a motley, coloured stream sways forward from every gate to the country beyond. This stream, like a vast funeral procession, is composed of brown-faced men, either trudging out to go beyond the horizon, or tramping in to blend with the swaying, steaming masses of men and animals in the streets. From dawn to dark

the muffled tread of shuffling feet never ceases, and at night dark, weary forms huddle together on the mud floors of every hut within the endless miles of streets, and there is no dark alley without the sleeping figures of homeless men.

Out in the country they are on the paths everywhere. They dot countless fields with colour as they work among the crops. Even in the dense, lonely jungle a man does not go far before he catches the flash of a white cap or a blue shawl.

A crowded zoological garden. The surging flood of animal life rivals the human. Camels swaying from side to side, donkeys buried under loads, bony cattle hitched to miserable carts, fight for their passage through the streets; hungry, homeless dogs in every lane eat ravenously the filth thrown from the windows; gloomy vultures perch on the gates, grey-headed crows crowd the open places like sparrows, and gay, noisy parakeets jabber at one another in the trees, which also resound with the chatter of sacred monkeys of various shapes and sizes.

Animal life in the country is as thronging and more varied. The swampy lands hum with fiery insects, venomous snakes lurk everywhere, ready to deal death to the careless, while the waters of the deltas are alive with crocodiles, snakes, and great frogs basking in the tepid mud. As one moves through the forest, birds of bright colours spring up at every movement, butterflies as large as birds flutter their glorious wings of azure and gold among the tree-tops, and noises innumerable tell the tale of countless other creatures in a throng of living things that haunt the forest.

As we travel on the back of an elephant through the jungle where mighty grass blades rise fifteen feet high, great clouds of insects leave a trail behind us as we advance; pea-fowl, partridge, wild-fowl, and quail, with startled squawks, flutter above the jungle grass and skim away to settle down again in the sea of green. At every elephant footfall, a rustle in the dense grass, a frightened shriek, or a furtive dart tells of deer, wild pigs, jackals, foxes, wild cats, hyenas, wild dogs, and many lesser creatures that dart through the lower growth unseen. If one could look minutely among the close network of matted grass, both living and dead, that carpets the humid soil of the jungle, a crawling, wriggling, darting mass of lizards, snakes, mice, insects, spiders, and every other creeping thing would stand revealed.

Such is the world of throbbing life that is packed in the Indian Peninsula.

The Indian crazy-quilt. My country is a land of colour, but alas! also a land of squalor, sorrow, and poverty. The plains and hill-sides during the dry season are dreary brown with withered plants, streaked with roads of deep white dust. The cultivated fields of cotton and wheat

By courtesy of Director of Education, Gold Coast.

FIG. 215. MAHOGANY LOGS IN WEST AFRICA

How large are the logs? Into what shape are they cut? How are they held together?

By courtesy of Commissioner of South Africa.

FIG. 216. A STUDY IN BLACK AND WHITE IN RHODESIA

Find Rhodesia on the map of Africa. The Blacks are many times as numerous as the Whites and they are used for all kinds of work. This negro is a nurse-maid.

By courtesy of Education Department, Zanzibar.

FIG. 217. HUSKING COCO-NUTS IN ZANZIBAR

How are the men dressed? Describe the method of husking. Where are the husked nuts piled? Where the unhusked? Describe the coco-nut trees.

stand out as slashes of daring green against the dull background. Dotted thickly over these plains are villages full of colour, towns with shining white houses, flashing domes, and glistening spires. Within the village, dull, shaded lanes contrast with gaudy houses. Above all, the surging humans in the streets give a mottled mass of colour. It is a land of many showy costumes, brilliant headgear, and glittering ornaments of gold and silver. In the bazaars, or streets of shops, all the colours of the rainbow flash out, made clearer by the background of chequered shade and the browns of mere dirt and grease.

India's festering sores. The bony bodies of half-starved men and women with grimy faces and sad, dull eyes that never smile, naked, uncared-for children, dull, narrow streets strewn with festering filth, piteous clusters of hovels daubed with mud, which one could not dignify with the name of hut, open spaces that should be green with grass and shaded with tress, covered with dust and dirt and overrun with skinny dogs, thin fowl, and half-starved cattle—these are the piteous pictures that make up a village.

The farms in the country are despairing, irregular patches snatched from the waste, the fields are neglected, and the cultivation is crude. Instead of roads you see uncertain tracks of dust wobbling drunkenly through the coarse grass of the jungle.

India's jewels. But India, my country, is a land of contrasts. The most gigantic mountains that seam the earth look down on a dead level plain that one could traverse for twelve hundred miles without finding even a small pebble. At the west of this great plain rain seldom or never falls, but at the east the greatest torrents on earth deluge the land. Besides these mean towns and still meaner villages, there are cities, such as Calcutta and Bombay, whose main streets and squares rival in beauty and cleanliness, and whose buildings rival in dignity those of the great cities of Europe and America. If my country has mean hovels, smeared with mud and dung, it has temples and monuments of the purest marble carved with the most chaste ornaments and set with jewels from every land.

The British touch. Though my country is still poor and sad, it has wonderfully improved under the rule of Great Britain during the last two hundred years. Then the whole country surged perpetually with civil war and was broken into a hundred brawling countries; now it is united and at peace. Then great famines reared their hideous heads and swept away millions of people; now famines are almost gone. Then disease and plague stalked through the land, and whole villages and towns died off like flies; now conditions have greatly improved and plagues are almost conquered. And these changes have come since India became a part of the British Empire.

CHAPTER XVIII

CALENDAR OF THE BRITISH EMPIRE

FIJI.

THE River Jordan in PALESTINE is overflowing its banks from rains which have been falling since October; the Zambezi River in RHODESIA is also very high and the Victoria Falls are at their best; the River Niger in NIGERIA is rising slowly, while rivers in the GOLD COAST are very low, the swamps dry, and vegetation withered.

GIBRALTAR and HONG KONG are having their coldest weather, but in the former the temperature drops only to 54° F., and in the latter to 40° F. In the MARITIME PROVINCES of Canada, however, the Strait of Northumberland is filled with ice, and navigation is only kept open by an ice-breaker.

GAMBIA, SOMALILAND, and the NICOBAR ISLANDS are having dry seasons. In Gambia the dry season began in December and has put an end to agriculture; in Somaliland it has compelled the dark skinned shepherds to drive their flocks of cattle from the low, dry coast to the higher interior in order to get pasture; and in the Nicobar Islands it has given suitable weather for harvesting tobacco.

CYPRUS, on the other hand, is having its winter rains, and the land is being prepared and planted with vetch, lentils, chick-peas, aniseed, flax, and potatoes. The Island of MAURITIUS, during this and the succeeding four months, has severe cyclones accompanied by torrents of rain, and the STRAITS SETTLEMENTS are having the wettest month of the year.

STRAITS SETTLEMENTS.

Many Canadians and Americans are now avoiding the cold winter by sailing to enjoy the balmy air of BERMUDA ISLANDS. Here they are planting one crop of onions and potatoes and harvesting another to ship to Canada and the United States.

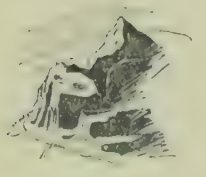
The negroes of NIGERIA, who are good farmers, are picking cotton, gathering and boiling palm nuts and then burying them in pits.

The cinnamon trees of CEYLON are making the air disagreeable with the smell of their greenish flowers; this month the natives finish picking cocoa pods.

INDIA is now in the midst of its cool season, the wheat fields are green, the poppy fields glow with beautiful flowers, sheep and cattle are grazing in the pastures, rice, sugar-cane and coffee are being gathered, and cotton-picking is just beginning.

In the BAHAMA ISLANDS the negroes are harvesting oranges, strawberries, potatoes, and cotton, and are making hemp from sisal in the factories, while in the FIJI ISLANDS, on the other side of the world, bananas are being both planted and picked, and yams are being dug.

Though SOUTH AFRICA is hot and wet the people are busy threshing wheat and picking strawberries, peaches, plums, grapes, pears and apples.

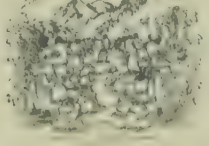


GIBRALTAR.

VICTORIA, SOUTH AUSTRALIA, and NEW ZEALAND are cutting wheat in the hot summer weather, while the wealthy from NEW SOUTH WALES and VICTORIA go to cool summer resorts in TASMANIA and NEW ZEALAND.

All CANADA, with the exception of Victoria and Vancouver in BRITISH COLUMBIA, is covered with snow, almost all rivers and lakes are ice-bound, in the north the trappers are busy outwitting the fur-bearing animals, in the forests of the east the trees are being felled and drawn to the frozen rivers. Smelt and eels are being caught through holes in the ice in the MARITIME PROVINCES. Halifax and St. John on the Atlantic coast, and all the harbours on the Pacific coast, are open, but Montreal and Quebec are ice-bound.

CANADA.



INDIA.

ZAMBEZI RIVER.

FEBRUARY

HONDURAS.

MANY tourists from GREAT BRITAIN, who have been visiting Egypt during the month, come up the Nile River to Khartum in ANGLO-EGYPTIAN SUDAN. Many CANADIAN and American tourists steam south to enjoy the warmth of JAMAICA and the BERMUDA ISLANDS. Many Americans also pay a visit to the BAHAMA ISLANDS.

One of the greatest contrasts in nature can be seen in PALESTINE; a person may stand near the shore of the Dead Sea blistering under a temperature of 120° F. and gaze on the glistening snow-cap on Mount Hermon only one hundred miles away.

The dry harmattan wind is blowing from the Sahara Desert over NIGERIA and covering everything with a coat of dust; the water in the Niger River continues to fall; the negroes are busy extracting palm oil from nuts.

The sportsmen of ENGLAND have finished shooting partridge and are beginning to hunt hares. This is the lambing season and many lambs are born. In the Lowlands of Scotland the grass is now green, and early potatoes are planted in the drier districts. Heavy rains fall throughout the British Isles.

This is one of the driest months in JAMAICA, the tobacco is being cut, and over six hundred pounds are often obtained from a single acre.

ENGLAND.

Sugar-cane is being cut in Southern INDIA, jute harvested in BENGAL, linseed and wheat are being gathered in the south, and young tea plants are being transplanted.

In the interior of NEWFOUNDLAND the loggers are cutting down spruce, tamarack, birch, and fir trees, and hauling logs over deep snow to the rivers. These same operations are being carried on in Eastern Canada.

While GREAT BRITAIN, CANADA, and NEWFOUNDLAND are having their coldest weather, HONG KONG is so warm that fires are no longer needed in the homes after this month; KENYA is having summer weather.

Workmen in BRITISH HONDURAS, who have been gathering chicle-gum, come out of the forest; other workers are beginning to cut mahogany and cedar, and still others are tapping the rubber trees.

Torrents of rain with thunder and lightning visit the FIJI ISLANDS this month. The natives are planting bananas and harvesting native products called wi and ivi; many men are fishing in the sea for turtles and bêche-de-mer.

The pasturage for cattle and sheep in SOUTH AFRICA is at its best, threshing continues, and peaches and other fruits are being shipped.

The negroes of NYASALAND are very busy planting cotton.

ENGLAND.

S. INDIA.

INDIA.

CANADA.

IRAQ.

THE British Empire has no great city on the equator where the sun now shines vertically, but Singapore in the STRAITS SETTLEMENTS and Nairobi in TANGANYIKA are less than one hundred miles from it.

As the snows are now melting in Armenia, the Euphrates and Tigris Rivers overflow their banks and flood parts of IRAQ (MESOPOTAMIA).

The rainy season begins in the NICOBAR ISLANDS and in the GOLD COAST, where it opens with tornadoes. MAURITIUS ISLAND also has terrible storms, which often do much damage. In PALESTINE and GIBRALTAR there have already been several rainy months, and the ground is gay with a robe of vivid green spotted with flowers of varied colours.

This is the hottest month in both the STRAITS SETTLEMENTS and ANDAMAN ISLANDS, and it is very dry in the latter.

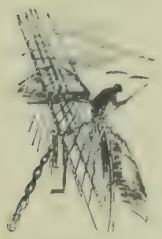
The cool season is over in NIGERIA, hot, dry, dusty winds blow in from the desert, the rivers are very low, but traffic is brisk on the dry roads.

The farmers of SIERRA LEONE are clearing the land in preparation for seeding when the rains come. Ginger is now being exported.

CYPRUS is having trouble fighting her plague of locusts.

The highlands of CEYLON are now bright and fragrant with the flowers of the coffee plant, while the fishermen of the island are diving into the sea for pearls.

While in CYPRUS tobacco is being planted, it is being harvested in NYASALAND and INDIA.



S. GEORGIA.

Europeans are now leaving the hot plains of INDIA and retiring to Simla and Darjeeling in the Himalaya Mountains. The natives, however, are busy harvesting wheat in the PUNJAB, planting jute in BENGAL, cotton in the north west, and picking tea in several places. The trees are shedding their leaves.

All is bustle among the NEWFOUNDLAND fishermen, as they are leaving in large sailing vessels to catch seals, brought south from the Arctic regions on the drift ice. They will be away for five weeks.

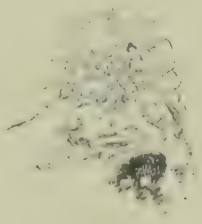
Cotton, sisal, and fruit-trees are being planted in the BAHAMA ISLANDS, while in the FIJI ISLANDS the main yam crop is harvested and stored in houses. Oranges are also gathered.

The herring fisheries in the North Sea begin in both ENGLAND and SCOTLAND; orchards are pruned, and barley, oats, and wheat are planted throughout the BRITISH ISLES. In Scotland the sheep are moved from the valleys, where they have been throughout the winter, to the hills.

Away in the Antarctic regions the whaling season is completed at SOUTH GEORGIA.

INDIA.

NEWFOUNDLAND.



SCOTLAND.

CEYLON.

APRIL

THE warmth of spring in the BRITISH ISLES quickens the earth, and crocuses, snowdrops and primroses push through to show their pretty faces and to spread their sweet perfume over the land. Workmen are busy both on sea and land; thousands of fishing-boats sail from the eastern coast of Great Britain to catch herring, haddock, mackerel, and flatfish in the North Sea and adjoining waters; farmers are planting wheat, oats, and vegetables in ENGLAND and SCOTLAND, and flax and root crops in NORTHERN IRELAND and the IRISH FREE STATE. Great quantities of Irish eggs are now crossing the Irish Sea to feed the cities of England.

CANADA.

During this autumn month in RHODESIA wheat is being sown, while in IRAQ (MESOPOTAMIA) it is being harvested. Much of this latter country is still flooded by the turbid waters of the Euphrates and Tigris Rivers as they rush to the Persian Gulf.

This month brings the rainy season to many parts of the British Empire. In ZANZIBAR on the east of Africa the south-west monsoon sets in and brings the heaviest rains of the year. NIGERIA and SIERRA LEONE on the west coast of the same continent have violent tornadoes and fearful thunderstorms to celebrate the beginning of the rainy season, and before the month is passed the negroes are busy planting rice, corn, peanuts, millet, onions, wheat, and cassava. BRITISH GUIANA in South America has its first month of rain, and HONG KONG, in Southern Asia, begins to feel the south-west monsoon, which shakes out its rain on the island; the land in the colony of HONG KONG is now being cleared in order to plant rice, corn, sugar-cane and vegetables. The island of MAURITIUS, on the other hand, welcomes the dry season, which lasts until December.

CEYLON.

Throughout CANADA and NEWFOUNDLAND the snow is rapidly melting, swollen streams rush down the logs and pulp-wood to the mills. The fishing fleet now leaves Newfoundland to spend the summer fishing for cod on the coast of LABRADOR. The southerly winds have scattered much of the ice in the Gulf of St. Lawrence, and navigation opens around PRINCE EDWARD ISLAND. Since December the Great Lakes and the St. Lawrence River have been sleeping like mighty giants, but the warmth of April destroys the icy bands, and navigation opens.

CYPRUS is harvesting wheat and barley, which are winter crops, and is planting cotton, corn, beans, and sesame.

Although the trees of INDIA shed their leaves last month, they are now a mass of bloom, and the natives are busy collecting the opium juice from poppies. The natives of CEYLON are kept busy, some peeling bark from cinnamon branches, others picking tea, still others placing coco-nuts in a moist place to sprout before being planted.

In SOUTH AFRICA winter rains are falling, ploughing and seeding are general, and grapes, late apples, pears, and peaches are ripening.

The scent of the orange blossoms in PALESTINE is delightful.

ENGLAND.

CEYLON.

LABRADOR.

HONG KONG.

MAY

SIERRA LEONE.

THE south-west monsoon is now drenching SIERRA LEONE, GOLD COAST, and NIGERIA, seeding is continued, and the second crop of palm nuts is gathered. In GAMBIA, their near neighbour, every plant has crumbled to dust, but before the end of the month the rain is pouring down in this colony also. The island of SOCOTRA and BRITISH GUIANA also have heavy rains. In the former, cotton and tobacco are planted, and the flocks are brought down from the mountains to the moist coast. In the SEYCHELLES ISLANDS, where the south-east monsoon is felt, and in BRITISH GUIANA, the dry season begins.

The malarial mosquito appears in CYPRUS, and for the next three months there is much malaria and other fevers on the island.

This is a gay month in the BRITISH ISLES; trees are in leaf, seeds are coming up, fields and woods are bright with flowers, and cattle and sheep are feasting in the juicy meadows. Sheep-shearing begins.

BRITISH NORTH BORNEO.

Wheat and barley are being harvested in PALESTINE, pine-apples in the BAHAMA ISLANDS, rice in BRITISH NORTH BORNEO, and arrowroot is prepared by the brown natives of the FIJI ISLANDS.

The fishing industry is in full swing in the MARITIME PROVINCES, traps are set near the shores for lobsters, nets for mackerel, and lines and trawls for cod, haddock, and halibut.

CANADA is bright with spring flowers and trees in leaf. The planting of grain and vegetables is nearly completed.

The logs cut during the winter, throughout CANADA and NEWFOUNDLAND, are now made into rafts and taken to the mills, which from now onwards hum with industry, and great piles of lumber are cut.

CANADA.

BRITISH SOMALILAND, though always warm, is now having its cool season, which is accompanied by heavy rains; as the coastal plain is clothed with green, sheep and cattle are brought down from the high interior.

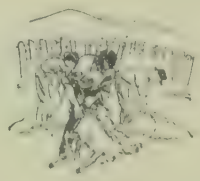
Though this is the hottest month in CEYLON there is much work done; cinnamon bark is peeled from the tree-trunks, tea-leaves are picked, and the spring picking of cocoa begins. As the south-west monsoon now roughens the sea the pearl-fishers have to cease work.

Walnuts, chestnuts, pine-apples, bananas, and gooseberries are now ripe in SOUTH AFRICA, and oranges, lemons, guavas, and tangerines begin to open.

The natives of BRITISH NORTH BORNEO are busy picking cotton and splitting rattan.

Cotton is being planted in BURMA, jute-sowing is completed in BENGAL, tobacco is harvested throughout INDIA, and tea seedlings are transplanted before the rainy season begins.

CEYLON.

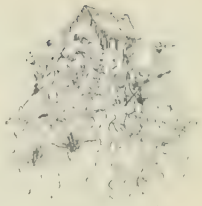


ENGLAND.

ENGLAND.

JUNE

This is a delightful month throughout the MARITIME PROVINCES, as the spring is well advanced, and the cold raw winds from the sea are replaced by cool refreshing breezes. The fruit trees are in blossom, and it is possible to drive for fifty miles in the Annapolis Valley through a bower of fragrant apple blossoms. The wheat throughout the PRAIRIE PROVINCES is sprouting and growing fast, and the farmers are nervously watching the weather. Many of the western farmers take their summer holidays at this time. The berries and cherries in BRITISH COLUMBIA are getting ripe, and Indians, Chinese, and whites are busy picking them. Buckwheat and turnips are planted in ONTARIO and QUEBEC. Navigation is open on the Mackenzie River right to its mouth, and Lake Athabaska is clear of ice.



S. AFRICA.

The dry fields of withered vegetation on the GOLD COAST have, by the heavy rains that began last month, been transformed into rank jungles of richest green. On the other hand the dry season has begun in GIBRALTAR, and vegetation is turning brown and withering.

The farmers of GAMBIA are feverishly stirring the soil, which is soaking wet with the heavy rains. They are planting peanuts, rice, millet, cotton, corn, tobacco, oranges, lemons, and mangoes. The Gambia River is now in flood and overflows its banks like the Nile.

NEWFOUNDLAND.

The farmers of ENGLAND and IRELAND are cutting hay during this pleasant month. In England the sheep are being sheared, and the cows, now that the pastures are rich, give large quantities of milk. In Ireland early potatoes are dug and gooseberries picked.

All along the southern coast of NEWFOUNDLAND there is a bustle in the villages, for the fishermen are setting their nets along the shore to catch cod, and they continue fishing until November.

While CANADA and GREAT BRITAIN are enjoying the long days, TASMANIA and NEW ZEALAND have their shortest days and see the sun rise in the north-east, go across the northern sky, and set in the north-west.

BURMA.

The negroes of SOUTH AFRICA and NYASALAND are preparing the soil for tobacco and planting it. In the former the first oranges of the season are being picked, packed, and shipped to Britain.

In both the WEST INDIES and UGANDA cotton is being planted.

At last the south-west monsoon bursts over INDIA and is accompanied by deluges of rain, which makes the soil soft for planting millet, cotton, and rice. The cutting of teak timber begins in BURMA and other parts of India.

IRELAND.

GAMBIA.

ENGLAND.

ENGLAND.

As one passes across Africa and Asia a little north of the equator the scenes are varied. In the west, SIERRA LEONE and NIGERIA are at the height of the rainy season, and the natives are busy hoeing their rapidly-growing crops. Though the ANGLO-EGYPTIAN SUDAN farther east is dry, the Nile River, which runs through it, is rapidly rising, thanks to the heavy rains in Abyssinia, where several of its tributaries rise. A little farther east BRITISH SOMALILAND is now withering up under the extreme heat and dryness of the south-west monsoon, so that the herds have to be taken back to the plateau. Just a little north of Somaliland, ADEN is receiving its only showers for the whole year. The south-west monsoon that makes Somaliland dry is soaking INDIA with the heaviest rains of the whole year, so that naked ground is changed to a mantle of vivid green.

CEYLON.

Hay-cutting begins throughout the MARITIME PROVINCES as well as in ONTARIO and QUEBEC. Navigation in Hudson Bay and its Strait opens. On a large part of the NEWFOUNDLAND coast lobsters are being caught and canned. Wooden ships that the Newfoundlanders have been making during the winter are now launched. The Strait of Belle Isle is at last free of ice, and trans-atlantic boats from Montreal take this shorter route to Europe.

The NIGERIANS are preparing land for cotton-planting and completing the harvest of palm oil and palm kernels. The Cingalese (natives of CEYLON) finish their cocoa harvest, while the Sudanese of the ANGLO-EGYPTIAN SUDAN are planting cotton, the natives of BRITISH NORTH BORNEO are tapping rubber trees, and the negroes of BRITISH HONDURAS are cutting sugar-cane.

HONDURAS.

The bogs of IRELAND are now alive with workers digging and drying turf and preparing it for market. The heather is coming out in flower and the heaths of SCOTLAND begin to glow with colour. As the herring in the North Sea are migrating south, this fishery is over in Aberdeen.

Although this is the coldest month in SOUTH AFRICA, and on the high-lands ice may form at night, along the coast, oranges, lemons, and tangerines are still being picked.

Although most parts of AUSTRALIA never see snow, yet during July much falls on the higher peaks of the Australian Alps, and many pleasure-seekers from Sydney and Melbourne ascend Mount Kosciusko to enjoy winter sports such as sleigh-riding, tobogganing, skiing, and skating.

BRITISH NORTH BORNEO.

IRELAND.

AUSTRALIA.

AUGUST

This is the hottest month in the BERMUDA ISLANDS, CYPRUS, GIBRALTAR, HONG KONG, and many other parts of the British Empire north of the equator. It is the coldest month in the GOLD COAST. IRAQ (MESOPOTAMIA) is burning up, all vegetation is withered, and the Euphrates and Tigris Rivers are very low; the Niger River in NIGERIA, on the other hand, is very high, and the rivers of the GOLD COAST are so full of water that great canoes with heavy cargoes navigate its streams.

The dry season begins in ZANZIBAR and continues until October.

Coco-nuts are ready to pick in the NICOBAR ISLANDS and are being planted in CEYLON.

Wheat and oats are being harvested in ENGLAND and SCOTLAND, and raspberries, gooseberries, and currants are being picked. The oyster fisheries begin in the south of ENGLAND, and there is considerable interest among English sportsmen as the season for shooting grouse opens.

The locust, a tree of CYPRUS, is in the strange condition of having this year's flowers and last year's pods on it at the same time; the latter are gathered this month.

Yams are planted, coco-nuts are ripe, and cotton is picked in the FIJI ISLANDS; in MAURITIUS ISLAND the natives begin cutting sugar cane, the main product of the island, and the harvest is not completed until December.

In parts of SOUTH AFRICA the peach and almond blossoms delight the eye and perfume the air.

Throughout NEW SOUTH WALES the sheep are being driven into pens and sheared with electrical clippers.

The sirocco, a hot dust laden wind from the Sahara Desert, blows strongly over MALTA, withering the vegetation, and covering everything with an ashy film.

In INDIA the rice seedlings are being transplanted from the seed-beds to the fields.

The collection of chicle, the chief component of chewing-gum, is beginning in the forests of BRITISH HONDURAS, while the tapping of the rubber tree is completed.

All over CANADA harvest operations are at their height. Tens of thousands of labourers go from Eastern Canada and ENGLAND to assist in harvesting the four hundred millions of bushels of wheat, and still larger quantities of oats throughout the PRAIRIE PROVINCES. The harvesting of wheat, oats, and barley is being carried on in Eastern Canada also. In the MARITIME PROVINCES blueberries and raspberries are being picked and early apples are put on the market.

NEW SOUTH WALES.

MALTA.

ENGLAND.

ENGLAND.

ENGLAND.

ENGLAND.

CEYLON.

TERRIBLE typhoons are likely to sweep over **HONG KONG**, and similar storms called hurricanes visit **JAMAICA**, injuring crops and homes.

The farmers of **IRELAND** are now harvesting tobacco, while the negroes of **SOUTH AFRICA** are transplanting the seedlings of the same plant.

In the **BERMUDA ISLANDS** they have already begun to plant potatoes and onions for an early crop.

It rains every day in the **ANDAMAN ISLANDS**, and the rainy season now begins in **BRITISH HONDURAS**. In the latter colony mahogany logs are brought out of the forest, cacao trees are planted, and sugar-cane is set out.

SUDAN.

After continuous drought since May, **PALESTINE** looks grey, dusty, and parched. The people, however, are busy harvesting millet and sesame, and picking figs, grapes, olives, melons, oranges, and pomegranates. In **CYPRUS**, near by, some fields are being sown with flax and broad-beans, while in others cotton is being picked.

After the winter, vegetation now springs to life in **RHODESIA**, the trees come out in leaf, sap flows, meadows become green, and beautiful flowers bring brightness to the land.

The Nile River is now at its highest throughout Egypt and the **ANGLO-EGYPTIAN SUDAN**; the great dam at Assouan is opened to let the surplus water through.

ENGLAND.

The most unhealthy season of the year is beginning in **INDIA**, but the native Indians work on harvesting rice and indigo and pulling jute. The rubber trees that are so numerous in **CEYLON** are being regularly tapped, and this process continues until the end of the year.

In **NEW ZEALAND** the planting of cereals is completed, and the people are very busy making cheese and butter and freezing and shipping meat.

Many sportsmen from the United States and **ENGLAND** penetrate the interior of **NEWFOUNDLAND** to hunt for deer and other game. Many of the hunters remain until Christmas.

The **ENGLISH** and **IRISH** are now picking apples, plums, and peaches; partridge-shooting, which begins this month, is not forgotten by the sportsmen of Great Britain.

In every township throughout **CANADA** several threshing machines are hard at work. The elevators in the **PRAIRIE PROVINCES** are filling with wheat and oats, and thousands of carloads are being rushed to Port Arthur, Fort William, and Vancouver, where the grain is loaded into steamers to be carried to Europe.

HONDURAS.

HONDURAS.

INDIA.

OCTOBER

BRITISH SOMALILAND is blessed with a second rainy season, which continues until the end of the year, But SOCOTRA ISLAND, a little to the east of it, has now entered its dry season, and the natives are busy picking cotton and harvesting tobacco.

TRINIDAD.

The most diverse crops are being harvested or planted in different parts of the British Empire. The negroes of GAMBIA are digging peanuts and cutting rice and corn. The dark-skinned natives of ZANZIBAR begin picking cloves, which are the unopened buds of a tree. In the island of CEYLON coffee berries and tea-leaves are being gathered. Cotton is being picked in INDIA, and as rice and other crops are harvested, wheat and flax are planted in their stead. In the STRAITS SETTLEMENTS rice, the chief crop, is planted. Bread-fruits are being picked in the FIJI ISLANDS. The chief cocoa crop is being picked in TRINIDAD. The natives of the NICOBAR ISLANDS are cutting sugar-cane.

CEYLON.

This month sees the end of the drought in several parts of the British Empire. The first rains cover PALESTINE with a bright green, which forms a great contrast to its appearance during the preceding month. At the beginning of this month, the hottest in the year, RHODESIA is parched and withered, but the rains soon revive it. As the drought in GIBRALTAR ends, annual plants come through the ground, trees unpack their buds and become a mass of green.

On the other hand some regions in the Empire are just beginning to feel the effects of the dry season. The NIGERIANS now see their rivers very low and are busy harvesting wheat. The BAHAMA ISLANDS also have a respite from rain and are engaged in picking fruit and planting pine-apples.

The farmers of GREAT BRITAIN are busy during this stormy month with fall ploughing, planting winter wheat, and digging root crops, while sportsmen have turned to pheasant-shooting.

GIBRALTAR.

Throughout CANADA the forests are a panorama of glorious colours as the leaves of the deciduous trees take on their autumn tints; nowhere in the world is such a blaze of colour seen, but by the end of the month the leaves are gone. Threshing continues, and the boats on the Great Lakes are very active in shipping the western wheat. The main apple crops are being picked, packed, and shipped. This month sees the end of the peaches, grapes, and tomatoes, which have now been on the markets of ONTARIO and QUEBEC for two months. Navigation through Hudson Strait closes toward the end of the month, and the Mackenzie River and Athabaska Lake are frozen over.

INDIA.

SOCOTRA.

NIGERIA.

NOVEMBER

KENYA.

THOUGH the mining of iron ore in NEWFOUNDLAND continues throughout the year, it receives a special stimulus at this period, as the fishermen's season is over, and many enter the mines for the winter.

Rains fall on the east coast of SOUTH AFRICA, cereals and peas are harvested, figs, early apples, and strawberries are ripe, and corn and cotton are sown.

Wheat and corn are being cut in QUEENSLAND, but in SOUTH AUSTRALIA the wheat is just heading out, and the hay harvest is in full swing.

ENGLAND.

The planters are picking the apple crop in KENYA.

This is the only month in the year when the FALKLAND ISLANDS do not have heavy rain. The rainy season begins in NYASALAND, and tobacco seedlings are transferred from the seed-beds to the fields. JAMAICA is also planting out tobacco—thirteen thousand plants to the acre.

Dates are being picked in SOCOTRA, and flocks are driven from the parched plain to better pastures in the highlands.

As the south-west monsoon is fading away, SIERRA LEONE is entering her dry season, and tornadoes from the east begin. Tornadoes are also playing havoc in the ANDAMAN ISLANDS.

SOCOTRA.

Tea-picking in CEYLON is completed, but coffee-picking continues, cocoa beans are collected, and cinnamon bark is peeled from the trees. Tea-picking is finished in INDIA during this month, but the Indians continue picking cotton and begin to plant poppy seed.

The salmon and herring fisheries close in SCOTLAND. In both GREAT BRITAIN and IRELAND ploughing is general, and wheat is sown. The hunting season opens in IRELAND, and sportsmen in ENGLAND turn to fox-hunting. In this country many store cattle are slaughtered for beef.

Ploughing is completed in Canada, snow falls in many places, the St. Lawrence is blocked with ice so that the port of Montreal is closed, and Canadian traffic passes more largely to St. John and Halifax. The grain traffic on the Great Lakes continues at high pressure. Great Slave Lake is frozen over.

CEYLON.

CANADA.

ENGLAND.

DECEMBER

Though this is the coldest month in the ANDAMAN ISLANDS, the average temperature is 79° F. In the island of CYPRUS the inhabitants are having the coldest weather also, the temperature dropping to 30° F.

BAHAMA ISLANDS.

The harmattan, or north-east trade-wind, is still blowing from the Sahara Desert over NIGERIA, SIERRA LEONE, and the GOLD COAST and brings heat, dryness, and dust, but the nights are cool. There is much traffic along the dry roads. Cotton is being picked in NIGERIA, and the cattle of the GOLD COAST are driven to the coast to be sold.

The harvesting of early onions and potatoes begins in the BERMUDA ISLANDS, while in the adjoining BAHAMA ISLANDS the people are busy picking cotton, cutting sisal, and picking, packing, and shipping oranges.

SOUTH AFRICA has begun her summer, tobacco being gathered, and such fruits as apricots, plums, peaches, and strawberries are being picked.

HONDURAS.

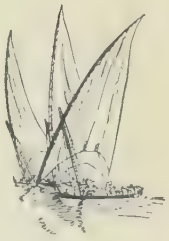
The wet season is beginning in the SAMOA ISLANDS.

The north-west monsoon begins to blow over the SEYCHELLES ISLANDS and continues until March.

Throughout WESTERN and SOUTHERN AUSTRALIA, VICTORIA, and NEW SOUTH WALES, the harvesting of many thousand acres begins. Wheat is also being cut in BURMA.

As the summer is approaching in the FALKLAND ISLANDS the ground is covered with a great variety of sweet-scented flowers.

This is the beginning of the picking season for cocoa-beans in BRITISH HONDURAS.

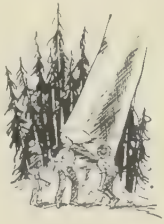


SAMOA.

ENGLAND and SCOTLAND have unsettled weather, grouse-shooting ends, and large numbers of beef cattle and poultry are being imported from IRELAND.

The rivers and all lakes except the Great Lakes in EASTERN CANADA are frozen over, but the Great Lakes never freeze. Navigation on the Great Lakes, however, closes this month, as the connecting rivers are blocked with ice. Great Bear Lake, the last of the great northern lakes to withstand the cold, is now frozen over. The harbour of Charlottetown in PRINCE EDWARD ISLAND is also covered with a layer of ice. Sleighing, skating, snow-shoeing, and skiing become general throughout Northern and Eastern Canada. Lumber camps are opened.

ENGLAND.



CANADA.

S. AFRICA.

EXERCISES

1. On the first day of each month study carefully the calendar for that month. Find in the Atlas the position of the places named, and picture to yourself the varied occupations, products, and climates of the different parts of the British Empire.

2. Write in a note-book the following list of products: wheat, barley, corn, millet, tobacco, sugar-cane, coffee, rubber, cocoa, rice, cotton, oranges, apples, peaches, pine-apples. After each product put the different months in which it is harvested in some part of the British Empire; also put the names of the regions in which it is harvested each month.

3. Write a list of all the regions that have monsoons, find their positions on Maps **3** and **4** in the Atlas, and state in what parts the monsoons are most pronounced.

4. Write a list of the regions in the British Empire that have a rainy and a dry season, and after as many as possible write the length of each season. In which of these regions are there monsoons? Which lie within the tropics?

5. The following strange products are mentioned in the calendar: vetch, lentils, chick-peas, aniseed, palm nuts, sisal, palm oil, jute, wi, ivi, bêche-de-mer, yams, millet, cassava, sesame, arrowroot, guava, tangerine, rattan, mango, teak, palm kernel, chicle, mahogany, pomegranate, broad-bean. Consult a dictionary, or better, an encyclopædia, to find a description of each of the above products; write after each its description, use, and the regions from which it is obtained.

INDEX

All numbers refer to pages; numbers in heavy type refer to pages on which are pictures illustrating the topic.

Abbotsford, 67, 68
Aberdeen, 138, 200, 203, 319
Abyssinia, 270, 319
Acacia, 255, 290, 307
Acorn, 232
Acropolis, 237
Aden, 319
Adige Valley, 247
Adrianople, 236
Adriatic Sea, 247
Ægean Sea, 232
Africa, Chap. XVI., 187, 191, 210, 237, 243; and Canada, **271**; coast, 265, 283; surface, 265
Agassiz, Lake, 25
Agricultural implements, 116, 119, 184, 219
Alabama, 104, 161
Alaska, 14, 40, 157, 220
Albert Nyanza, 269, **272**
Alberta, **63**, 79, 80, 97, **121**, 124
Alentejo, **239**
Aleutian Islands, 38
Alexandria, 265, **272**, 273
Alfalfa, 153
Algeria, 274, 279
Algonquin, Lake, 25
Alhambra, **239**
Allin Lake, 25
Allspice, 303
Almaden, 241
Almond, 251, 320
Alps Mountains, 89, 214, 230, 243, 244
Aluminium, 184
Amazon River, **166**, 167, 168, 171, 180, 210
Amsterdam, 211, 213
Amur River, 259
Andalusia, 241
Andaman Islands, 315, 321, 323, 324
Andes Mountains, 167, 168, **168**
Anglo-Egyptian Sudan, 314, 319, 321
Animal life in India, 308
Animals of jungle, 308
Aniseed, 313
Annapolis Valley, 318
Anthracite, 59
Antwerp, 211, 213
Anyox, 60, **63**
Apennine Mountains, 244
Appalachian Mountains, 104
Appalachian Plateau, 145
Apple, 71, 72, 75, 115, 154, 157, 251, 288, 313, 316, 318, 320, 321, 322, 324
Apricot, 71, 72, 318
Arab, 203; beggar, **258**; woman, **258**
Arabia, 259
Arabian Desert, 252
Aral Sea, 260
Archangel, 224, 225
Arctic Ocean, 37, 224, 256
Ardennes Mountains, 212
Area of a continent, **185**
Areas of the continents, 187
Argentina, 102, 168, 171, **174**, 176, **181**, 184, 192
Arizona, 161
Armenia, 259, 315
Armenian Knot, 252
Armstrong, 71, 72
Arrow Lakes, 22, 25, 62
Arrowroot, 317
Arsenic in Canada, 64
Artesian well, 291
Asbestos in Canada, 64, **106**
Ash, 108, 112
Ashcroft, 76
Asia, Chap. XV., 187, 195; cities, 260; climate, 260; deltas, 256; plains, 256; prairies, 256; rivers, 256; transportation, **253**, 259
Asia Minor, 232, 236, 252
Asparagus, 157
Ass, 237, 251, 259
Assiniboine River, 94, 125
Assuam, 270; dam, 270, 273
Astoria, **148**
Astrakhan, 224
Atacama Desert, 183
Athabaska Lake, 318, 322
Athabaska Pass, **82**
Athens, 237, **240**
Atlas Mountains, 265, 274, 279
Attar of roses, 235
Australia, 48, 112, 187, 191, 192, 288–92, 319; surface, 288
Australian Alps, 319
Australian Desert, 291
Automobile, 61, 62, 119, 124, 186, 219
Autumn tints, 322

Bab el Mandeb, **249**
Babine Lake, 25, 34, 63
Bacon, 115, 116, 120, 150, 192, 204, 213, 214, 217
Bahama Islands, 313, 314, 315, 317, 322, 323
Baku, 226
Balata, 183
Balkan Mountains, 232, **235**, 236
Balkan Peninsula, 244
Balsam fir, 314
Baltic Sea, 191, 214, 220, 223, 226
Baltimore, 141, 142
Banana, 162, **182**, 184, 288, **301**, 303, 313, 314, 317
Banff, 88
Bangkok, **268**
Banks of Newfoundland, 129 *seq.*
Barcelona, 241
Barge Canal, 107
Barkerville, 76

Barley, 93, 149, 184, 203, 204, **221**, 223, 224, 230, 237, 238, 251, 259, 273, 274, 279, 315, 316, 317, 320,
Barndoor skate, 128
Barrie, **106**
Basel, 244
Basra, **258**
Basswood, 112
Bauxite, 183
Bay of Fundy, 129
Beans, 162, 171, 251, 316
Bear, 2, 6, 14, 153, 232
Beaver, **3**, 5, 14
Bêche-de-mer, 314
Beech, 108, 112, 243
Beech-nut, 232
Beef, 150, 179, 192
Beira, 265
Belfast, **194**, **202**, 204
Belgian Congo, 213
Belgium, 211, 212, 213, 214, 217
Belgrade, 232, 235, 236, 237
Bella Coola, 63
Belle Isle Strait, 319
Belleville, **121**
Bengal, 314, 315, 317
Berbers, 279
Bergen, 138, 223
Bering Strait, 37, 252
Berlin, 191, 219, 225, 230
Bermuda Islands, **302**, 313, 314, 320, 321, 324
Berry, 157
Bilbao, 241
Binder, **91**, 97
Binder twine, 97
Birch, 108, 112
Birmingham, 195, **202**
Bituminous coal, 59
Black bear, **45**
Black cod, 39
Black Country, 195
Black earth belt, 225
Black Sea, 214, 224, 226, 229, 232, 236
Blackwater River, 76
Blast-furnace, 195, 210, 213, 218, 241
Blue fox, **3**
Blue Mountains, 141
Blueberries, 320
Boer, 295
Bog, 204, 319
Bogota, 169
Bohemia, 218, 230
Böhmerwald, 229
Boiler-making, 204
Bolivia, 179, **181**, 184
Bolton, 195, **202**
Bombay, 308
Bonito, **127**
Book-printing, 203, 218, 219
Boot- and shoe-making, 108, 225, 229
Bor, 232
Borneo, 180
Bosporus, Strait of, 236, **249**
Boston, 138
Boulder, **19**
Boulder clay, 21
Boulogne, 138, 205
Bow River, 94
Bradford, 195
Brandon, 93, 94, **121**
Brantford, 116
Brass, 61
Brassware, 236
Brazil, **127**, 134, 168, 171, 176, **178**, 180, 184
Brazilian Highlands, 167
Bread-fruit, 292, 322
Breaker-boy, 59
Bremen, 219, 220
Brenner Pass, 230, 247
Breslau, 217, 218
Brewing, 204, 230
Bridge River, **84**
Bridges over Fraser River, **81**
Bristol, 196, 199, 200, **202**
Britannia Beach, **50**, 61
British Columbia, Chaps. III., IV., 22, **84**, 87, 88, 111, 112, 157, 318; climate, 43; coast, 40; forests, 40; mines, 59–62, 63, 64
British Empire, 61
British Guiana, 178, 183, 184, 316, 321
British Honduras, 314, 319, 320, 321, 324
British Isles, 316
British North Borneo, 317, 319
British Somaliland, 319, 322
Broad-bean, 321
Brockville, **121**
Bronze, 61
Bruges, 211, 212, 213
Brussels, 212, 213
Bucharest, 232
Buckwheat, 318
Budapest, 231, 236
Buddhist shrine, **268**
Buenos Aires, 167, **172**, 176, **177**, 179
Buffalo, N.Y., 107, 120, **144**, 145, 146
Bulbs, 212
Bulgaria, 231, 235, 236
Bulgarian women, **234**
Bulkley River, **63**, 76
Bulkley Valley, **77**
Burma, 270, 317, 318, 324
Burns Lake, 76, **84**
Burrard Inlet, 47, 108
Bury, 195
Butter, 115, 116, 120, 150, 192, 204, 212, 213, 214, 223, 244, 300, 321

Cacao, 171, 321
Cactus, 158
Cadiz, 241
Cairo, **272**, 273
Calais, 205
Calcutta, 260, 308
Calgary, **85**, 94, **121**, 123
California, 157
Camel, 251, 255, 274, 279, 308
Canada, 186, 191, 316, 317, 320, 321, 322; agriculture, 80; codfish, **127**
Canadian National Railways, 51, 83, **86**, 87, 101, 124
Canadian Pacific Railway, 51, **86**, 87, 94
Canadian Shield, 5, **95**, 104
Canals, **105**, **208**, 212
Canberra, 288
Cannery, **148**
Canoe, 6, **8**, 40
Canso, 134, 138
Cantaloupe, 71
Cape Horn, 48
Capetown, 265, 299
Capitol, Washington, 141
Caravan, 255, 279
Cardiff, 196
Caribbean Sea, 303
Cariboo Road, 75
Caribou, 2, 13
Carolina, 161
Carpathian Mountains, 224, 225, 229, 231, 232
Carpet, 124, 236
Carpet-making, **232**
Cascade Mountains, 154, 157
Caspian Sea, 225, 226, 260
Cassava, **276**, 316
Cassidy, **49**, **50**
Castlegar, 62
Cataract, 270, **272**
Cattle, **65**, 68, 79, 149, 150, 171, **178**, **181**, 184, 192, 204, 212, 214, 217, 220, 225, 226, 230, 238, 243, 247, 295, 307, 308, 314, 317, 323, 324
Cattle ranch, 150, 101
Cedar, 314

Celery, 72
Ceuta, 237
Ceylon, 180, 313, 315, 316, 317, 319, 320, 322, 323
Chad, Lake, 266
Champagne Country, 209
Charcoal, 196
Charlottetown, 125, 324
Chatham, Ont., **106**, **121**
Chaudière Falls, 112
Cheese, 115, 116, 120, 150, 212, 213, 244, 321
Cherries, 71, 251, 318
Chesapeake Bay, 142
Chestnut, 247, 317
Cheviot Hills, 204
Chewing-gum, 320
Chicago, 37, 119, 146, 149, 150
Chick-peas, 313
Chicle, 314, 320
Chilcotin River, 76, 79, **84**
Chile, 61, 168, 171, 176, **178**, 179, 183, 184, 199
Chilko Lake, 25
Chilliwack, 67, 68, **84**
China, 48, 101, 157, 251, 259, 260, 261
China-ware, 196, 218, 225, 230
Chinchilla, **3**
Chinese, 292; coolie, 295; gardens, 295; gardeners, **253**
Chocolate, 171, 244
Chum salmon, 29
Church, **228**
Churchill, 101
Chute, 44
Cigarettes, 231
Cigars, 231
Cinchona, 171, 211
Cinnamon, 313, 316, 317, 323
Clams, 39
Cleveland, 120, 146
Climate, 171–6
Clocks, 244
Cloverdale, 67
Cloves, **285**, 322
Clyde River, 199, 200, 204
Coal, 52–60, 112, 146, 157, 180, 184, 199, 204, 205, 213, 291
Coal in Canada, 59
Coal-cars, **49**, 50
Coal-mine entrance, **49**
Coal mines, 112, 195, 196, 199, 203, 204, 210, 212, 213, 218, 219, 225, 229, 230, 231, 232, 241, 242, 307
Coal-tar, 59
Coalmont, 59
Coast Mountains, 40, 43, 154, 157, 158
Cobalt, 63, 64
Coburg, **106**
Cochrane, **106**
Cocoa, 171, **178**, 180, **181**, 183, 184, 210, 211, 219, 303, 304, 313, 317, 319, 322, 323, 324
Coco-nut, 295, 303, **310**, 316, 320
Cod, 39, **127**, 129, 133, 134, 200, 220, 223, 226
Cod-fishing, 316, 318
Codfish drying, **135**
Coffee, 162, **178**, 180, **181**, 183, 184, 210, 211, 219, 280, 300, 303, 313, 315, 322, 323
Coho salmon, **23**, 29
Coke, 59, 61, 146, 196, 210
Cola-nut, 304
Collars, 145
Colliery, **193**
Collingwood, **106**
Cologne, **215**
Colombia, **181**, 183
Colon, 163
Colorado River, **147**, 161
Columbia River, 38, 43, 154, **155**, 157, 158
Concentrator, **50**, 57, 61
Condensery, 68
Congo River, 266
Constance, Lake, 244
Constantinople, 232, 236
Copenhagen, 214
Copper, 55; 154, 163, 171, **178**, **181**, 184, 199, 212, 218, 232, 241, 242
Copper in Canada, **63**, 64, **106**
Copper mining, **50**, **54**, **57**, 60, 61
Copper Mountain, 61
Copra, 295
Coral, **127**
Cordillera, **95**
Cork, 238, **239**, 243
Cork, Ireland, 204, 205
Cork oak, 238, 243
Corn, 145, 149, 150, 162, 171, 179, **181**, 183, 184, 231, 232, 247, 273, 300, 316, 318, 322, 323
Corn belt, 149
Côte d'Or, 209
Cotton, 120, 161, 162, 180, **181**, 191, 195, 204, 210, 219, 225, 230, 236, 237, 241, 255, 259, 262, 273, 274, 280, 288, 300, 307, 313, 314, 315, 316, 317, 318, 319, 321, 322, 323, 324
Cotton field, 273
Cotton goods, 184, 186, 273
Cotton mills, 108, **190**, 211
Cotton thread, 204
Cotton tree, 283
Cotton-weaving, **306**
Courtright, **106**
Coventry, **202**
Cowboy, 150
Coyote, 14, 75
Cranbrook, 62
Creamery, 68, 76, 150, 300
Creston, 62, 75
Crocodile, 269, 283
Crofter, 203
Crooked River, 93
Crowsnest Pass, **82**
Croydon Aerodrome, 205
Cuba, **127**, 163
Cumberland, B.C., 59
Currant, 320
Cusk, 39
Cutlery, 195, 231
Cutting grain, **91**
Cyclone, 313
Cyprus, 313, 315, 316, 317, 320, 321, 324
Czecho-Slovakia, 230

Daffodils, 212
Dairy cow, 214
Dairying, 204, 214, 217, 220, 226, 229, 247, 300
Dairying in Canada, **65**, 67, 94, **106**, 115, 116
Dairy produce, 80, 150
Dakota, 150
Danube River, 229, 230, 231, 232, 236, 243, 247
Danzig, 229
Dardanelles, 236
Darjeeling, 315
Darling River, 292
Date-palms, **282**
Dates, 236, 255, **263**, 273, 274, 279, 323
Dauphin, **121**
Dawson, 63
Dead Cities, 211
Dead Sea, 266, 314
Deccan, 252
Deep-sea fishermen, 129
Deer, 6, 203, 321
Delaware Bay, 142
Delta of Mississippi, 161
Delta of Nile, 273
Denmark, 213, 214, 217, 220, 300
Depot Harbour, 107
Derby, 196

Detroit, 119, 146
Detroit River, 107
Diamond, **178**, 211, 213, 296, 299
Diamond drill, 56
Dijon, 209
Dinaric Alps, 232
Distillery, 203, 204
Dividing Range, 288
Dixon Entrance, 37
Dneister River, 231
Docks, **109**, **144**, 191
Dogfish, 133
Dog-sleigh, **7**
Dog-train, 6
Doldrums, 138, 175
Don River, 225
Donetz coalfield, 225
Donkey, 308
Dortmund, 219
Dory, 130
Douglas fir, 40, **42**, 48
Douro River, 242
Dover Strait, 205, **249**
Dredge (fishing), 129; (mining), 52
Dresden, 218
Drilling (mining), 56
Drumheller, **121**
Dryden, 112
Drying codfish, **135**
Dublin, **202**, 204
Dudley, **202**
Duisburg, 219
Duluth, **144**, 146
Dundas, 116
Dundee, **202**, 203
Dutch Guiana, **178**, 183
Dutch people, 211
Dvina River, 224
Dyes, 219
Dykes, 212

East Indies, 262
Easter lilies, **302**
Ebony, 303
Ebro River, 238, 239, 241
Ecuador, 168, 171, **178**, 184
Edinburgh, **202**, 203
Edith Cavell Mount, 88
Edmonton, **85**, 94, 98, 101, **121**, 123, 126
Eel, 39
Eggs, 80, 94, 150, 192, 204, 213, 214, 316
Egypt, 48, 120, 191, 195, 270, 314, 321
Elbe River, 217, 218, 219, 230
Electrical power, 68, 112, 124, **152**, 244
Elephant, **250**, **264**
Elephant's tusk, 273, 274
Elevator, 98, **99**, **100**, 101, 107, **109**
Elm, 112
Emerald, 168, **181**, 183, 185
Emigration, 248
Ems River, 217
England, 120, 180, 191, 192, 195, 196, 199, 241, 243, 273, 314, 316, 318, 320, 321, 324
English Channel, 191, 200
Equator, 138
Equatorial Africa, 210
Erie, 146
Erie Canal, 145
Ermine, **3**, 9, 14
Esker, **28**
Eskimo, 1–5, 6, **7**, **8**
Espanola, 112
Esparto grass, 241
Essen, 219
Essington, **63**
Esthonia, 226, 229
Euphrates River, 259, 315, 316, 320
Europe, Chap. XIV.
Eutsuh Lake, **84**
Everest, Mount, 252
Extension coal-mine, 59

Factories of Canada, 108, 112, **114**, 115, 116
Falkland Islands, 323, 324
Famine, 311
Farming in Asiatic Delta, 259; in Europe, 204, 209, 212, 214, 217, 232; in Nigeria, 304
Fig, 157, 237, 321, 323
Fiji Islands, 313, 314, 315, 317, 320, 322
Film-making, **156**
Finlay Forks, 93
Finlay River, 93
Finland, 191, 226, 229
Fiord, 220
Fire-prevention, 48
Fire-ranger, 48
Firth of Clyde, 203
Firth of Forth, 200, 203
Fisher, **3**
Fisheries, 38, 39, 115, **127**
Fishermen, 129, 213, 214
Fishing, **132**
Fishing fleet, **131**
Fishing gear, 130
Fishing in British Columbia, 34–9; in England, 200, 316; in Maritime Provinces, 39, **106**, 129–34, 317; in Norway, 220; in Russia, 224, 226
Fishing schooner, **106**, 130, **131**
Flanders, **207**, 209
Flatfish, 316
Flax, 179, **201**, 203, 204, 209, 224, 229, 247, 313, 316, 321, 322
Florida, 161, 163
Flounder, 200
Flour, 184
Flour mills, 108, 231, 232
Flume, 47, 72
Ford factory, 116, 149
Forest, 5, **106**, 108, 217–18, 220
Forest conservation, 218
Forest fire, 48
Forest protection, 48
Fort Francis, 112
Fort Rae, 6, **7**
Fort St. John, 6, 93
Fort Smith, 6, **15**
Fort William, 98, **106**, 107, 123, 124
Fox, 2, 14
Fox-hunting, 323
France, 48, 102, 184, 191, 205–11, 212, 213, 217, 238, 243, 247
François Lake, 76, **84**
Fraser Delta, **78**
Fraser Lake, 76
Fraser River, **24**, 67, 76, **81**, **84**, 101
Fraser Valley, 68
Freezing plant, 37
French Guiana, 178, 184
French people, 209
Frijoles, 162
Fruit canneries, 115
Fruit-growing in B.C., 62, 71–5
Fruit market, Zanzibar, **276**
Fruit-packing, **74**
Fuji, Mount, **254**
Fur, 1, **3**, 87, 218, 224, 226
Fur-bearing animals, 14
Fur seal, 2, **3**

Galashiels, 204
Galatz, 232
Galt, **106**, 116, **121**
Gambia, 304, 313, 317, 318, 322
Gambia River, 291, 304, 318
Game preserves, 203
Ganges River, 246, 252, 259, 260
Gardner Canal, 63
Garonne Valley, 206, 209
Gaspé, 104

Geneva, 244; Lake, 244
Genoa, 247
Georgia, 161
Germany, 120, 184, 191, 196, 210, 211, 213, 214–20, 223, 229
Geyser, 153, **160**, 300
Ghent, 211, 212, 213
Gibraltar, 313, 315, 318, 320, 322
Gibraltar Strait, 210, **249**
Gill-net, **24**, 30, 200
Ginger, 303, 315
Glacial period, 21, 104
Glacial scratches, 21
Glacier, 243, 252, 255
Glasgow, 199, **202**, 204
Glass, 213, 218, 219, 230
Gloucester, 138
Gloves, 145
Gloverville, 145
Goat, 231, 237, 247, 251, 255, 274, 283, 296
Goat Island, 104
Goderich, **106**, 107, 116, 124
Gold, 52, 55, 62, 76, 154, 157, 158, 168, **178**, **181**, 292, 307
Gold in California, 158
Gold in Canada, 61, 62–3
Gold Coast, 304, 313, 315, 316, 318, 320, 324
Gold mine, 58, **158**
Gold-mining, 52, 63, 287
Gold-washing, 53
Golden Horn, 236
Gooseberry, 317, 318, 320
Gordon Head, **73**, 75
Göteborg, 223
Grain, 184, 192, 212, 214, 219, 225, 226, 229, 235
Grain routes, 105
Gran Chaco, 179
Granada, **239**
Granby Colliery, 50
Grand Bank, 129
Grand Canyon of Colorado River, **147**, 161
Grand Forks, 62
Grande Prairie, 90, 98
Granite, 203
Grapes, 115, **173**, 183, 209, 235, 237, 241, 247, 274, 288, 292, 300, 313, 316, 321
Grape-fruit, 161, 303
Graphite, **106**
Gravel ridge, **19**
Great American Desert, 158
Great Bear Lake, 324
Great Britain, 48, 98, 183, 184, 188–204, 206, 220, 223, 314, 318, 322
Great Central Plain, 161
Great Lakes, Chap. IX., **105**, 316, 322, 324
Great Northern Railway, **86**
Great Plains, **95**
Greece, **127**, 236–7
Greenland, 18
Grimsby, 138, 200, **202**
Ground-nuts, 304
Grouse-shooting, 320, 324
Guadalquivir Valley, 238, 241
Guadiana River, 242
Guava, 317
Guelph, **106**, 116, **121**
Guiana, 184, 211
Guiana Highlands, 167
Gulf of Finland, 224
Gulf of Genoa, 247
Gulf of Georgia, 68
Gulf of St. Lawrence, 316
Gulf Stream, 134, 137
Gum, 273, 274, 280
Gum arabic, 279
Guinea Coast, 307

Haddock, 39, **127**, 129, 133, 200, 316, 317
Hague, The, 211
Haida Indians, 38
Hair, 225
Hair seal, **3**
Hake, 39, 129, 133, 226
Halibut, 34, 37, 38, 39, 88, 126, **127**, 129, 133, 157, 317
Halifax (N.S.), 108, 123, 126, 134, 138, 188
Halifax (England), 195, **202**
Ham, 115, 116
Hamburg, 191, 219, 220, 230
Hamilton, 116, **121**, 125, 126
Hammer drill, **53**
Hamster, **3**
Hand loom, 304, **306**
Hankow, 260
Hardanger Fiord, 223
Hardwoods, 108, 112
Hare, **3**
Hare-shooting, 314
Harmattan, 314, 324
Harpooning a whale, **35**, 37
Harrison Lake, 25, **84**
Hartz Mountains, 218
Hatch on boat, 146
Hatzic, 72
Hausa, 280
Havana, 163
Havre, 191
Hawaii, 157
Hawick, 204
Hay, 68, 75, 80, 115, 220, 226, 243, 318, 319, 323
Hazelton, **63**, 76
Health training, **177**
Heather, 217, 319
Hecate Strait, 37
Helsingfors, 226
Herculaneum, 248
Hermon, Mount, 314
Herring, 34, 39, **127**, 129, 200, 220, 223, 226, 316, 319, 323
Herring fisheries, 203
Hidden Creek copper mine, 60
Hides, 184, 186, 191, 225
Highlands of Scotland, **198**, 200, 203
Himalaya Mountains, **246**, 252, 259, 315
Hippopotamus, 269, **305**
Holland, 211, 212, 213, 214, 220, 300
Hollinger mine, **58**, 63
Hollywood, **156**
Hong Kong, 313, 314, 316, 320, 321
Hops, 230
Horse, 192, 226, 237, 251, 255, 259
Horse Fly Lake, 76
Horse latitudes, 137, **139**, 176
Hot Belt, 162
Hot springs, 300
Huddersfield, 195, **202**
Hudson Bay, 1, 14, 94, 104, 319
Hudson Bay Company, Chap. I.
Hudson Bay Company posts, 6, 9, 10, **11**, 13
Hudson Bay Railway, 124
Hudson River, 145
Hudson Strait, 319, 322
Hudson Valley, 145
Huerta, 241
Hull, England, 138, 200
Hull, P.Q., **106**, 112, 116
Humpback salmon, **23**, 29
Hungarian Plain, 229, 230, 232
Hunting, **122**
Hurricane, 321
Hut in Zanzibar, **297**
Hwang-ho, 259, 260
Hyacinths, 212
"Hydraulicing," 52
Hydro-electric power, **152**

Iberian peninsula, 237–43, 244

Ice cap, Chap. II.
Igloo, 2
Illinois, 149
Immigrants' homes, **92**
India, 102, 120, 191, 211, 251, 261, 273, 307–11, 314, 315, 316, 317, 318, 319, 320, 321, 322
Indian, 1, 5, 6, 10, 13, 38, 162
Indian people, 307
Indian village, 308
Indiana, 149
Indians of Brazil, **166**
Indigo, 239, 321
Indo-China, 259, 261
Indus River, 259
Inshore fisheries, 129
Interior Plateau, B.C., 43
Iodine, 183, 186
Iowa, 149
Iran Plateau, 252, 259
Iraq, 315, 316, 320
Ireland, 192, 200, 204, 205, 300, 316, 317, 318, 321, 323, 324
Irish Sea, 200
Iron, 146, 196
Iron Gates of Danube, 229, 232
Iron goods, 184, 195, 210
Iron ore, 62, 146, 195, 196, 203, 204, 205, 210, 212, 213, 218, 223, 225, 230, 232, 241, 242, 323
Iron ore dock, **144**
Iron smelting, 108
Iroquois Falls, 112
Irrawaddy River, 259
Irrigation, **66**, 76, 157, 241, 247
Italy, 102, **127**, 184, 209, 230, 244, 247, 248
Ivi, 314

Jamaica, **127**, 163, 314, 321, 323
James Bay, 104
Japan, 48, 61, 101, 157, 261, 262
Japanese children, **254**
Japanese room, **254**
Java, **267**
Jersey calves, 65
Jewellery, 210, 231, 236
Johannesburg, **298**, 299
Johnstown, 145
Joliette, **106**
Jordan River, 313
Jungle, 308
Juniper, 217
Jute, 203, 259, 315, 317, 321
Jutland Peninsula, 214

Kangaroo, **3**
Kansas, 150
Kapuskasing, 112
Kaslo, 62
Kauri gum, 303
Kauri pine, 303
Kayak, 2, **8**
Kazan Pass, 232
Keating, 75
Kelowna, **70**, 71, 72
Kelp, 38
Kenya, 314
Kettle valley, 71
Khartum, 269, **272**
Kicking Horse Pass, **82**, 87
Kidderminster, **202**
Kiel, 219, 220
Kiel Canal, 219
Kiev, 224
Kildonan, 34
Killer whale, 38
Kimberley, B.C., 62
Kimberley, South Africa, 299
King Island, **63**
Kingston, Jamaica, 163
Kingston, Ont., 107, 112, **121**
Kippers, 34, 200
Kirkcaldy, **202**, 203
Kitchener, **106**, 116, **121**, 124
Kolinsky, **3**
Komati River, **305**
Kootenay district, 243, 249
Kootenay Lake, 22, 25, 75
Korea, **253**
Kosciusko, Mount, 323
Kraal in Natal, **297**
Kremlin, Moscow, **227**
Krupp works, 219
Kurile Islands, 38
Kyugot, 34

Labrador, 18, 316
Labrador Current, 134, **139**
Lac la Hache, 76, **84**
Lace, 212
Lachine Rapids, 104
Ladner, 86
Lake Erie, 104, **105**, 146
Lake Louise, **16**
Lake Michigan, 107, 150
Lake of the Woods, **20**, **121**, 123
Lake Ontario, 104, **105**, 112, 119
Lake Superior, **105**, 107, 146
Lake Winnipeg, 94, 123
Lanarkshire coalfield, 199
Lancashire, 195
Laplander, **216**
Lard, 150
Latvia, 226, 229
Lead, 55, 163, 212, 213, 218, 241, 242, 292
Lead in Canada, 52, 61, 62, **63**
Leather, 218, 219, 225
Le Bourget aerodrome, 205
Leeds, 195, **202**
Leicester, **202**
Leipzig, 218
Lemon, 157, 248, 279, 288, 300, 317, 318
Lena River, 256
Leningrad, 219, 224, 225
Lentils, 313
Lethbridge, **121**
Lettuce, 157
Levis, **106**, 116
Lichen, 256
Liège, 212
Lignite, 59
Lille, 210
Lillooet River, **84**
Lima bean, 157
Lime, 157
Limerick, 205
Limestone, 61, 204
Lindsay, **106**
Linen, 203, 204, 212, 218, 225, 226, 230, 247
Linen-bleaching, **201**
Linoleum, 203
Linseed, 123, 184, 314
Lisbon, 242, 243
Lithuania, 226, 229
Little Saanich Mountain observatory, 213
Liverpool, 102, 188, 195, 196
Loading boats, **144**
Lobster, 39, **127**, 129, 220, 319
Lobster trap, 317
Locomotive works, 145
Locust, 315
Locust tree, 320
Lode-mining, 52
Lodz, 229
Lofoten Islands, 220
Logging, **41**, **42**, 44, **46**, 47, **155**, 224, 314
Logging railway, **46**
Logwood, 303
Loire Valley, 206, 209
Lombardy, 243, 244, 247
London, England, **189**, 191, **197**, 200, 212, 214
London, Ont., **106**, 116, **121**
Londonderry, 205
Lorraine, 210, 219

Los Angeles, 158
Louisiana, **151**, 161
Lower Fraser River, **84**
Lowland Plain of Europe, 205
Lowlands of St. Lawrence, 115
Lowlands of Scotland, 200, 203, 314
Lübeck, 219
Lucerne, 243
Lumber, 47, 108, 157, 180, 218, 223
Lumbering, 76, **106**, 110, 154, 220, 224, 226
Lumber-mills, 112
Lunenburg, **128**, 129, 130, 134, 138, **139**
Luxembourg, 212, 219
Lynx, 10, 14
Lyons, 209
Lys River, 212

Mabel Lake, **84**
Macaroni, 247
Macedonian plain, 237
Machinery, 115, 180, 195, 218, 219, 225
Mackenzie River, 6, 318, 322
Mackerel, 39, **127**, 129, 316, 317
McLeod Lake, 93
Madrid, 242
Magdalena River, 167, **170**
Magyar, 231
Mahogany, 283, 303, 304, 314, 321
Mahogany in West Africa, **309**
Main River, 211
Malacca Strait, **249**
Malaga, 241, 242
Malaria, 317
Malay, 292, **294**
Malay Peninsula, 292
Malay States, 295
Malaya, 180 191, 199, 295
Malmö, 223
Malta, 320
Manaos, **172**
Manchester, 195
Mangoes, 318
Mangrove, 283
Manhattan Island, 142
Manitoba, 80, 94, **121**, 150
Maple, 108, 112
Maple sugar, 112, 115
Map-making, 203
Marine engines, 204
Maritime Provinces, 313, 318, 319
Marseilles, 209, 210, 247
Marten, **3**, 9, 14
Marten trap, **12**
Maryland, 161
Matches, 223, 244
Matterhorn Peak, **245**
Mauritius Island, 313, 315, 316, 320
Meat, 186
Medicine Hat, 93, 94, **95**, **121**
Mekong River, 259
Melbourne, 288, 319
Melon, 321
Mendoza, **173**
Mercury. *See* Quicksilver.
Merino sheep, 242
Merritt, 59
Mersey River, 195, 196
Mesopotamia, 315, 316, 320
Mestizo, 162
Metal goods, 184, 273
Meuse Valley, 211, 213
Mexico, 162, 172, 191
Mexico City, 162, 163
Mica, **106**
Michigan, Lake, 149, 150
Middlesbrough, 196, **202**
Milan, 247
Milk, 68, 115, 150, 214, 244
Millet, 251, 259, 262, 316, 318, 321
Mining, Chap. V.
Mining in South America, 168
Mining town, 154
Mink, **3**, 5, 10, 14
Minnesota, 150
Mission, 72
Mississippi River, 161, 171
Missouri River, 149, 171
Mixed farming, 72, 75–9, 93, **106**
Mohawk Valley, 145, 149
Mojave Desert, **160**
Molasses, 183
Mongolia, 255
Monkey, 283, 308
Monsoon, 261, 316, 317, 318, 319, 323, 324
Montana, 153
Montevideo, 167
Montreal, **106**, 107, **109**, 112, 116, 123, 313, 319, 323
Montreal Island, 104
Moors, 237
Moose, 6
Moosejaw, **121**
Moravia, 230
Moravian Gate, 218
Moritza River, 232
Moscow, 223, 225, 226
Mosquito, 283, 317
Motor-car, 146, 149, 195
Mount Robson, 88
Mount Shasta, **147**, 157
Mountain agriculture, 243
Moving pictures, **156**, 158
Mulberries, 247, 251
Mulberry trees, 209
Murray River, 292
Muskeg, 1, 6
Musk-ox, 13, 14, **15**
Musk-rat, **3**, 5, 9, 14
Mutton, 179

Naden Harbour, 37
Nairobi, 315
Namur, 212
Nanaimo, 34, 59
Nancy, 210
Naples, 247
Naramata, 72
Natal, **297**
Natalhuz Lake, **84**
Nebraska, 150
Nechako River, 76, **84**
Nechako Valley, **77**
Necker River, 211
Negroes, 279, 307
Negroes of Canada, 307
Nelson, 62, 63
Nelson River, 22
Netherlands, 184, 186, **207**
New Brunswick, 111, 129
New Orleans, **143**, 161, **172**
New South Wales, 313, 320, 324
New Westminster, **27**, 47, 48, 67, 101, 138
New York City, **140**, 141, 142, 145
New Zealand, 48, 71, 112, 288, 300, 303, 313, 318, 321
Newcastle, 196, 199, **202**, 214
Newfoundland, **127**, 129, 314, 315, 316, 317, 318, 319, 321, 323
News-print, 47, 111
Niagara Falls, 104, **105**, **106**, 112, 120, **121**, 124
Niagara Peninsula, 115
Niagara River, 104
Nickel in Canada, **58**, 63
Nicobar Islands, 313, 315, 320, 322
Niger River, 265, 266, 280, 313, 314, 324
Nigeria, 280, 283, 304, 307, 313, 314, 315, 316, 317, 319, 322, 324
Nile River, 265, 266, 269, 270, **272**, 314, 319, 321
Nitrate, 171, **178**, 183, 186

Nizhnij Novgorod, 224, 226
Nomad, 255, 273
Nome, 14
Nootka Indians, 38
North Battleford, **121**
North Island, N.Z., 300, 301
North Sea, 200, 211, 214, 219, 315
Northern Africa, 209
Northern Canada, climate, 2, 5; people, 1; police, **7**; surface, 1, 5; transport, 6
Northern Plain, Canada, 13
Northumberland Strait, 313
Norway, 220, **221**, 223
Norwich, **202**
Notre Dame Mountains, 115
Nova Scotia, **63**, 97, 111, 129
Novgorod. *See* Nizhnij Novgorod.
Nursemaid of South Africa, **310**
Nuts, 171
Nyasa Lake, 266
Nyasaland, 314, 315, 318

Oak, 108, 112
Oasis, 255, 279, **282**
Oats, 75, 93, 115, 123, 145, 149, 153, 183, 204, 209, 212, 217, 223, 238, 251, 315, 316, 320
Obi River, 256
Observatory Inlet, 60, **63**
Ocean Falls, **63**
Ohio, 112, 149
Oil, 186, 191, 219, 232
Oil palm, 283
Oil well, 158, 232
Oil-cake, 214
Oil-cloth, 203
Oil field, 226
Ojibway Lake, 25
Oka River, 226
Okanagan, **74**
Okanagan-Cariboo Trail, **66**, 71, 75
Okanagan Lake, 22, **66**, 71
Okanagan Valley, 68, **70**, 154
Oldham, **190**, 195, **202**
Olive, 157, 237, 242, 243, 247, 274, 279, 321
Olive oil, 210, 237, 274, **281**
Olive tree, 238, 241, 247, 274, **281**
Oliver, B.C., **69**, 71, 72
Onion, **70**, 72, 241, 251, 313, 316, 321, 324
Ontario, **63**, 80, **106**, 111, 112, 116, **121**, 318, 319
Ootsa Lake, 76, **84**
Opium, 259
Oporto, 242
Opossum, **3**
Optical glass, 212
Oran, 274
Orange, 157, 161, 241, 248, 274, 279, 288, 292, 300, 303, 313, 315, 316, 317, 318, 321, 324
Orchards, **66**
Organs, 115
Orillia, **106**
Orinoco River, 167
Oroville, 71
Osaka, 262
Oshawa, **106**, 116
Oslo, **216**, 223
Ostrich, **277**
Ostrich farm, 299
Ostrich feather, 273, 274, 300
Ottawa, **106**, **109**, 112, 115, 116, **121**, 123, 124
Otter, **3**
Owen Sound, 115, **121**, 124
Oyster, **127**, 129, 142
Oyster fisheries, 320

Pacific Highway, 67
Pack River, 93
Paddy, 292
Paint, 61
Paisley, **202**, 204
Palestine, 313, 314, 315, 316, 317, 321, 322
Palm kernel, 304, 319
Palm nut, 304, 313, 317
Palm oil, 304, 314, 319
Palos, 241
Pamir, 252
Pampas, 176
Panama, 163
Panama Canal, 48, 101, 163
Panama hat, 184
Paper, 108, 109, 112, 115, 191, 219, 223, 226
Para, **172**, 180
Paraguay, **178**, 184
Parana River, 176, 179
Paris, France, 191, 205, **206**, **208**, 209, 210, 219, 230
Parliament buildings, London, **189**, 191
Parliament buildings, Ottawa, **109**, 112
Parliament buildings, Winnipeg, **118**
Parrot, 283
Parsnip River, 93
Parthenon, **240**
Partridge, 308
Partridge shooting, 314, 321
Pass, 83
Passes through Rockies, **82**
Patagonia, 175, 179
Peace River, 79, **84**, 90, 93
Peace River district, 79, 90, **95**
Peace River Pass, **82**
Peach, 71, 72, 115, 157, 274, 288, 314, 316, 320, 321, 324
Peachland, 71, 72
Pea-fowl, 308
Peanut, 304, 316, 318, 322
Pear, 115, 251, 274, 313, 316
Pearl, **127**
Pearl fisheries, 317
Pearl fishing, 315
Pearl shell, **127**
Peas, 251, 323
Peat, 204
Peebles, 204
Pennine Mountains, 192
Pennsylvania, 112
Penticton, 71, 72
Peos, 231
Pepper, 303
Perch, 39
Perfume, 210, 280
Persia, 191, 273
Persian Gulf, 259, 316
Persian lamb, **3**
Peru, 168, **181**, 184
Peterborough, **106**, 116, **121**, 124
Petroleum, 191
Pheasant shooting, 322
Philadelphia, 141
Pianos, 115
Pickerel, 34
Piedmont, 141
Pig, 75, 149, 150, 214, 217, 231, 232, 243
Pike, 39, 226
Pilchard, 34, 39, **127**
Pindus Mountains, 232, 236, 237
Pine, 108, 161, 218, 220
Pine River Pass, **82**
Pineapple, 157, 292, 300, 303, 317, 322, 324
Piræus, 237
Pit-props, 48, 220, 223
Pittsburgh, 140
Placer mining, 52
Plague, 311
Plaice, **127**, 200
Plata River, 167, 179
Platinum, 52, 55, **181**, 226
Ploughing in Australia, **293**

Ploughing in North Africa, **281**
Plum, 71, 115, 157, 232, 251, 313, 321, 324
Plum brandy, 232
Po Valley, 247
Poland, 191, 217, 229
Polder, **207**, 212
Polenta, 247
Pollock, 39
Pomegranate, 321
Pompeii, 248
Poppy, 255, 259
Poppy planting, 323
Population of the continents, 187
Porcupine, **106**
Pork, 116, 150, 217
Port Arthur, Manchuria, **257**
Port Arthur, Ont., 107, 112, 124
Port Colborne, 107
Port McNicol, 107
Port Nelson, 124
Port Simpson, 63
Port wine, 242
Portage La Prairie, **121**
Portage Plains, **91**
Porters in Africa, **278**
Portland, 154, 157
Portland Canal, **63**
Portland Channel, 62
Porto Rico, **127**
Portugal, **127**, 199, 237, 242–3
Portuguese, 168, 180
Potash, 218
Potatoes, 75, 153, 217, **222**, 223, 230, 313, 314, 318, 321, 324
Potomac River, 141
Pottery, **169**, 196
Pouce Coupé, 79, 90
Poultry, 80, 150, 214, 324
Powdered milk, 68
Prague, **228**, 230
Prairie levels, 94, **95**
Prairie Provinces, 77, 95, 318, 320, 321
Prescott, 107
Preston, 116
Prince Albert, 94, **121**
Prince Edward Island, 316, 324
Prince George, 76, 93
Prince Rupert, **36**, 37, 47, **63**, 76, 98, 138, **172**
Prince of Wales's Ranch, **99**
Princess Royal Island, **63**
Princeton, 59
Prospector, **53**, 60
Prune, 157
Prune drying, **148**
Puget Sound, 157
Pulp-mills, 47, 108, **111**, 115, 223, 226
Pulp-production in Canada, **106**
Pulp-wood, 316
Punch press, **113**
Punjab, 315
Punta Arenas, **172**, 184
Purse-seine, 30, 34
Puzzle of British Industry, **202**
Puzzle of Canadian geographical names, **136**
Pyrenees Mountains, 206, 238, 242

Quail, 308
Quebec City, **106**, 108, 112, 115, 116, 123, 126, 188, 313
Quebec Province, **63**, 80, **106**, 111, 112, 116, 319
Quebracho, **178**, 179, 184
Queen Charlotte Islands, 43
Queen Sound, **106**
Queensland, 288, 323
Quesnel, 76, **84**
Quesnel Lake, 25
Quesnel River, 76, **84**
Quicksilver, 241, 242
Quinine, 171
Quinnat salmon, 29
Quito, **170**, **172**

Rabbit snare, **12**
Rabbits, **3**, 288, **290**, 291
Raccoon, **3**
Radishes, 251
Raffia, 283
Rafts, **155**, 157
Railways of Argentina, 179
Rainfall, **172**
Raisins, 157, 241
Rand, 299
Rapids, **15**
Raspberry, 251, 320
Rattan splitting, 317
Red cedar, 40, 48
Red Deer, **121**
Red lead, 61
Red River, 22, 94, 123, 124
Red Sea, 266
Regina, **121**, 123, 126
Reindeer, 14, **216**
Reindeer moss, 13
Rhine funnel, 217
Rhine River, 206, 209, 211, 212, 213, 214, **215**, 217, 218, 219, 220, 243
Rhodesia, **310**, 313, 316, 321, 322
Rhodope Mountains, 232, 237
Rhone Valley, 206, 209, 243
Ribbon-making, 210
Rice, 157, 161, 162, 251, **253**, 255, 259, 273, 274, 292, 313, 316, 317, 318, 320, 322
Rice-threshing, **151**
Richmond, **106**
Rideau Canal, 112
Rift valley, 266
Rio de Janeiro, 138, **139**, 167, **177**, 180
Rio Tinto mines, 247
Riviera, 192
Rivière du Loup, **106**
Roads in South America, **169**, 170
Rocky Mountain Canyon, 93
Rocky Mountain goat, **45**
Rocky Mountains, 5, **16**, 83, 87, 89, 94, 101, 153
Rolling-mill, 195, 210, 213
Romania, 231, 232
Rome, 248
Root crops, 115, 226, 243, 322
Rose Harbour, 37
Roses, 235
Rossland, 61, 62
Rostock, 214
Rotterdam, 211
Rouen, 211
Royal Canadian Mounted Police, **7**
Rubber, 108, 171, **178**, 180, **181**, 184, 191, 210, 311, 319
Rubber goods, 184, 219
Rubber plantation, 295
Rubber tree, **182**, **294**, 314, 320, 321
Rudolph, Lake, 266
Rug-weaving, 237
Russia, 103, 120, 191, 203, 204, 223–6, 229, 231
Russian peasant, 225
Russian peasant house, **227**
Rye, 212, 217, 223, 224, 230, 238

Sable, **3**
Safety-lamp, 56
Sage-brush, 153, 158, **160**
Sahara Desert, 266, 270, 274, 314, 320, 324
St. Andrews, N.B., 138
St. Boniface, **121**
St. Catharine's, **106**, 116, **121**, 124
St. Clair Lake, **105**, 107

St. Etienne, 210
St. Hyacinthe, **106**, 116
St. John, 108, 123, 126, 188, 313, 323
St. John's, **106**, 116
St. Lawrence River, 22, 104, 107, 108, 111, 119, 323
St. Louis, **172**
St. Malo, 138
St. Paul's Cathedral, 191
St. Peter's, Rome, 248
St. Thomas, **106**, **121**
Salmon, **23**, 26–34, 38, 88, 126, **127**, 157, 220, 226, 323
Salmon cannery, **27**, **28**, **31**, 33, **148**, 199
Salmon ladder, **31**
Salmon trap, **24**, 29, 30, **32**
Salmon-fishing, **24**
Salonika, 232, 236, 237
Salt fish, 34
Salt-bush, 291
Saltpetre, 183
Samoa Islands, 324
San Francisco, 158
San Mateo, 34
Sandstone, 195
Sand-storm, 299
Santa Fe Railway, **86**
Santiago, **172**, 183
Santos, 167, 180
São Paulo, 180
Saône Valley, 206
Sardine, 39, **127**, 129, 243
Sardis, 68
Sargasso Sea, 137
Sarnia, **106**, **121**, 124
Saskatchewan, 80, 94, **121**, 150
Saskatchewan River, 22, 94
Saskatchewan–Nelson river system, 171
Saskatoon, 94, **121**, 123
Sault Ste. Marie, **106**, 107, 112
Save River, 232
Saw-mill, 47
Saxony, 218
Saxony Triangle, 217, 218
Scandinavia, 191, 214, 220
Schenectady, 145
School, 75, **286**
Schooner, **131**
Schwys Canton, 243
Scotland, 200, 203, 204, 315, 316, 320, 323, 324
Scrub, 291
Seal, 2, **127**, 157
Sealing, 315
Sea-otter, **3**
Seattle, 14, 157
Seine, 129
Seine River, 206, 211
Selkirk Mountains, **82**
Selkirk, Ont., **121**
Selkirk, Scotland, 204
Serbs, 232
Sesame, 316, 321
Settler's house, 75, **77**
Seville, 249
Sewing-machines, 186
Seychelles Islands, 317, 324
Shaft of mine, 56
Shanghai, 260
Shawinigan Falls, **106**, 112, 116
Shawl, 236, 273
Sheep, 75, 171, **178**, **181**, 183, 192, 203, 204, 217, 225, 226, 230, 231, 235, 237, 238, 241, 247, 251, 255, 274, 283, 288, 292, 296, 313, 314, 315, 317, 320
Sheep of Argentina, **174**
Sheep of Australia, **289**
Sheep ranch, 153, 161, 300
Sheep's-back hills, 21
Sheep-shearing, 317, 318, 320
Sheet mills, **194**
Sheffield, 195, **202**
Sherbrooke, **106**, 116
Ship, **278**
Shipbuilding, 199, 204, 205, 219, 220, 319
Ships on Great Lakes, 146
Shipyards, 199
Shrine, **268**
Shuswap Lake, 25, **84**
Siam, **268**
Siberia, 224, 225, 256, 261
Siberian Railway, 256
Sicily, 248
Sierra Leone, 304, 315, 316, 317, 319, 323, 324
Sierra Nevada Mountains, California, 157
Sierra Nevada Mountains, Spain, 238
Silesia, 218, 230
Silesian Trough, 217
Silk, 157, 209, 210, 236, 241, 244, 247
Silk goods, 186, 231, 241, 247, 273
Silk-mills, 108
Silkworm culture, 209, 247
Silver, 154, 163, **181**, 292
Silver in Canada, 52, 61, 62, **63**
Silverware, 236
Similkameen Valley, 61
Singapore, 295, 315
Sirocco, 320
Sisal, 315, 324
Sitka spruce, 43, 51
Skate, 133
Skating, 319, 324
Skeena River, 29, **31**, **32**, **63**
Skeena Valley, 76
Skiing, 319, 324
Skim-milk, 214
Skunk, **3**
Skyscrapers, **117**
Slave River, **15**
Slaves, 307
Slavs, 230
Sleighing, **216**, 324
Slovakia, 230
Smelt, 39, 313
Smelter, **54**
Smithers, 76
Smith's Falls, **106**
Smooth Rock Falls, 112
Snakes, 308
Snood, 130
Snow-flake, 17
Snow-shoeing, 6, 324
Soap, 210
Sockeye salmon, **23**, 26
Socotra, 317, 322, 323
Soda, 145
Soda Creek, 76, **84**
Sogne Fiord, 223
Sole, **127**
Somaliland, 313, 318
Somme River, 206
Soo Canal, **105**, 107
Sorel, **106**
Sounding-lead, 130
South Africa, 48, 62, 63, 120, 295–9, 313, 314, 315, 316, 317, 318, 319, 320, 323, 324
South America, Chap. XIII., 187, 191, 200, 210, 243
South Australia, 323, 324
South Georgia Islands, 315
South Island, N.Z., 300
Southampton, 188
Spain, 102, **127**, 184, 191, 199, 206, 237, **238**, 241, 242
Spaniards, 162, 168
Spanish onion, 241
Spices, 191, 210, 211
Spinach, 157, 251
Spinifex, 290
Spinning, **234**
Spinning in West Africa, **306**
Spirit River, 90
Sponge, **127**
Sport in Norway, **216**
Spraying, 72
Spring salmon, **23**, 29
Spruce, 108, 111, 314

Squamish, 76, 84
Squirrel, **3**
Staffordshire coalfield, 195, 196
Starfish, 133
Stassfurt, 218
Steam coal, 199
Steam engine, 195, 196, 219
Steel, 146, 195, 213, 241
Steel goods, 184, 219
Steelworks, **194**, 218
Steppes of Russia, 225
Stettin, 219
Stewart, **63**
Stockholm, **221**, 223
Stockings, 145
Stoke-on-Trent, 196
Stook, 97
Stores, **114**, 115
Stork, **258**
Strait of Belle Isle, 319
Straits Settlements, 295, 313, 315, 322
Strasbourg, 217
Stratford, **106**, 116, **121**
Strawberries, **73**, 75, 313, 323, 324
Sturgeon, 39, **127**, 226
Sturgeon Falls, 112
Sudan, 279
Sudbury, **106**
Sudd, 269
Suez Canal, 209
Sugar, 157, 163, **178**, 179, **181**, 183, 184, 191, 211, 213, 217, 229, 230
Sugar-beet, 153, 209, 212, 217, 229, 230, 231, 235
Sugar-cane, 162, **178**, 273, 288, 313, 314, 315, 319, 320, 321, 322
Sugar-maple, 112
Sugar-mill, 231
Sugar-refinery, 108
Sullivan mine, **57**, 62
Sumas Lake, 67
Summerland, B.C., 71, 72
Summit Lake, 93
Swansea, 196, 199, **202**
Swanson Bay, **63**
Sweaters, 145
Sweden, 199, 219, 223
Swift Current, **121**
Swiss village, **245**
Switzerland, 209, 213, 229, 243, 244, **245**
Sydney, N.S., 112
Sydney, Australia, 288, 319
Syracuse, N.Y., 145

Tacla Lake, 25, **84**
Tacoma, 61
Tagus River, 242
Tamarack, 314
Tanganyika, 315
Tanganyika, Lake, 266
Tangerine, 317, 319
Tangier, 237
Tapioca, **276**
Tasmania, 288, 313, 318
Tea, **178**, 191, 210, 259, 300, 314, 315, 316, 317, 322, 323
Tea planting, 317
Teak, 318
Telkwa, 59, **63**, 76
Telkwa River, **63**
Temperature, **172**
Temple, 270
Terminal moraine, 21
Termite nest, **275**
Terrace, **63**
Teslin Lake, 25
Texas, 161
Thames River, **189**, 191, 199
Thetford Mines, 64
Thompson River, **84**
Thorold, 112
Thrace, 236
Three Rivers, **106**, 108, 112, 116
Threshing, 97, 314, 322, 323
Tiber River, 248
Tibet, 252, 255, 259, 260, 261
Tiger-hunt, **250**
Tigris River, 259, 315, 316, 320
Timbuktu, 280
Timmins, 63
Tin, 55, 61, 171, **181**, 184, 199, 218, 292, 307
Tin mine, **294**
Tobacco, 161, 162, 163, 183, 184, 211, 231, 235, 237, 241, 313, 314, 315, 317, 318, 321, 322, 323, 324
Tobogganing, 319
Tokio, 262
Toledo, 146
Tomatoes, 71, 72, 322
Tools, 195, 219
Tornadoes, 316, 323
Toronto, Chap. X., **106**, 112, **114**, 116, **117**, **121**
Torrid zone, 162
Tortillas, 162
Tourist trade, 244, 248
Tower of London, 191
Town in desert, **282**
Toy-making, 218, 244
Trade-winds, 137, 138, 162, 175, 288
Trans-Andine railway, 179, 183
Transcontinental railways, **86**
Transportation in Korea, **255**
Trap, 9, **12**
Trap-nets, 129
Trapper, 1, 313
Trapper's home, 9
Trapper's tent, **8**
Trapping, 1, 9
Trawl, 130, 133, 317
Trent River, 192
Trinidad, **127**, 322
Trolling-line, 30
Trondjhem, 223
Tropical calms, 137
Tropical forest, **165**
Tropical rain forest, 283
Trout, 39, 115, 220
Troy, N.Y., 145
Tula coalfield, 225
Tulips, 212
Tullibee, 39
Tundra, 1, 5, 14, 224
Tunnel, 56
Tunny, **127**
Turf, 320
Turkey, 236
Turks, 236, 237
Turnips, 318
Turpentine, **159**
Turtles, 314
Tweed cloth, 204
Tweed River, 204
Tyne River, 192
Typhoon, 321
Tyrol, 230

Uganda, 318
Ulster, 204
Underclothing, 145
Ungava Peninsula, 5, **19**
Union Pacific Railway, **86**
United States, Chap. XII., 61, 62, 102, 183, 184, 195, 196, 217
University of Toronto, 125
Unterwalden Canton, 243
Upper Fraser River, 43, 76
Ural Mountains, 223, 224, 225, 226
Uri Canton, 243
Uruguay, 171, **181**
Uruguay River, 179
Utica, N.Y., 145

Valencia, 241, 242
Valleyfield, **106**, 116
Valparaiso, 183
Vancouver, 47, 48, 67, 88, 98, 101, 108, 123, 124, 138, **172**

Vancouver Island, 34, 37, 40, 47
Vanderhoof, 76, **77**, **84**
Vardar River, 232
Vardar Valley, 236, 237
Vatican, 248
Vegetable ivory, 184
Vegetables, 80, 212, 316
Veld, 296, 299
Velvet, 241
Venezuela, **181**, 184
Venice, 247
Vera Cruz, 162
Vernon, **66**, 71, 72
Vesuvius, Mount, 248
Vetch, 313
Victoria, B.C., 37, 47, 48, 68, 125, 313
Victoria Falls, Rhodesia, 313
Victoria Nyanza, 266, 269, **272**
Vienna, 218, 219, 230, 231, 232, 236
Vineyards, **173**, 209, 231, 235, 241, 242, 248
Virginia, 161
Vistula River, 217, 219
Volcano, 300
Volga River, 225, 226
Volga Valley, 224
Vosges Mountains, 209

Wakefield, 195
Wales, 199
Walnut, 157, 255, 317
Walsall, **202**
Warrington, **202**
Warsaw, 219, 225, 229
Washington, D.C., 141
Washington State, **151**, **152**, 154
Waterford, Ireland, 204, 205
Waterloo, 116
Water-power, 52, 111, 112, 115, 120, 220, 223, 230, 232
Weaving, **234**
Weaving in West Africa, **306**
Welland, **106**
Welland Canal, 104, 107
Weser River, 217, 219
West Africa, 120, 304–7
West Indies, **301**, 303, 318
Westerly winds, 134, 176, 184
Western Australia, 324
Western cedar, 40, 48
Western hemlock, 43
Westminster Abbey, 191
Wetaskiwin, **121**
Weyburn, **121**
Whale, 2, **35**, 37, 38, 39, **127**
Whale guano, 37
Whaling, 37–8, 315
Wheat, Chap. VIII., 87, 123, 124, 145, 149, 150, 153, 154, 162, 171, 179, 180, **181**, 183, 184, 191, 209, 217, **222**, 225, 230, 231, 232, 237, 238, 247, 251, 259, 273, 274, 279, 288, 292, 313, 314, 315, 316, 317, 318, 320, 322, 323, 324
Wheat of Argentina, **174**
Wheat belt, 150
Wheat of England, 192
Wheat export from Canada, **103**
Wheat harvesting, **91**
Wheat routes, 124
Wheat-field, **96**, 149, 154
Wheelbarrow, 259
White ant, **275**
White fox, **3**
White lead, 61
White Sea, 226
Whitefish, 39, **127**
Wild goat, 154
Wild sheep, 153
Williamette River, 154
Williamette Valley, 157
William's Lake, 76, **84**
Windsor, Ont., **106**, 112, **121**
Wine, 180, 209, **234**, 235, 236, 241, 247
Winnipeg, Chap. X., 94, **118**, **172**
Wisconsin, 150
Wolf, 2, 6, 14, 232
Wolverine, 9, 10
Wood pulp, 47, 111, 115, 224
Woodstock, **106**, 116
Wool, 179, 191, 192, 203, 204, 219, 225, 235, 236, 241, 247
Woollen goods, 180, 192, 203, 204, 218, 225, 229, 230, 241
Worcester, England, 196, **202**
Wyoming, 153

Yang-tsze-kiang, 259, 260
Yam, 313, 315, 320
Yarmouth, England, 138, 200
Yarmouth, N.S., 138
Yellowhead Pass, 76, **82**, 83, 87
Yellowstone National Park, 153, **160**
Yenisei River, 256
Yerba maté, 179, 180, 186
Yorkshire, England, 192
Yorktown, **121**
Yucca tree, **160**
Yugo-Slavia, 231, 232, 235
Yukon Territory, 63

Zambezi River, 266, 313
Zanzibar, **276**, **285**, **310**, 316, 320, 322
Zinc, 55, 61, 62, 199, 212, 213, 218, 292
Zinc in Canada, 52, 62, **63**
Zuider Zee, 212
Zurich, 244

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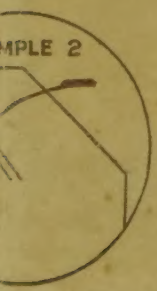

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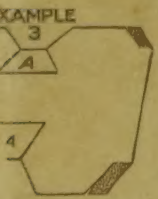

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